VOLUME VI NUMBER 11

# MINNESOTA MEDICINE

*Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association Northern Minnesota Medical Association and Minneapolis Surgical Society*



## NOVEMBER 1923

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# MINNESOTA MEDICINE

*Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association Northern Minnesota Medical Association and Minneapolis Surgical Society*

VOL. VI NOVEMBER, 1923 No. 11

## ORIGINAL ARTICLES

### THE FUNCTIONS OF THE STATE MEDICAL ASSOCIATION*

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*Rochester, Minnesota*

The objects of this association are to federate and to bring into one compact organization the entire medical profession of the state, and to unite with similar organizations in other states in the formation of the American Medical Association.

The compactness of our state association has been evident since its beginning, owing largely to the fact that most of its members are graduates of the Medical Department of the State University and are members of the same alumni association. There has been no tendency toward the formation of cliques within the association, and it is very important that no such subdivisions shall be made. I believe that this policy will obtain so long as we have but one medical school, and so long as we are able to keep the standards of the profession above medical politics.

The nucleus of all medical organizations is the county medical society. A group of physicians of good moral and ethical standing in the county may organize a county society, and this society may become one of the units of the state association and be entitled to one delegate in the House of Delegates. If the county has but few medical men, then two or more counties may join in organizing a society; thus every man in the state has an opportunity to become a member of a county society, and it is his duty to take advantage of this opportunity. Joint or district societies have no direct contact with the state association, nevertheless I believe that they are an important part in the organization of the profession in the state, since they result in interesting and enthusiastic meetings for those who may not have an opportunity to attend other similar meetings. At least two of these societies in our state have, for a number of years, been a stimulus to their members, and have been important factors in the progress and development of medicine in the state. District societies do not and should not have a separate representation in the state organization, as each county in the society has its delegate in the House of Delegates of the State Association. When the membership of the county society is small and composed of physicians whose practice keeps them at home most of the time, it is sometimes so difficult to maintain interest in the meetings that they are dropped. This is unfortunate, since often a little more effort will tide over a difficult situation and place the society on a firmer basis than before. Medical meetings are for the purpose of interchanging ideas, discussing medical problems and getting the medical community together socially. The membership need not necessarily be large to be of real service, yet it should be large enough to promote free discussion of the scientific problems presented, and also to encourage the development of a social program. Some of the county medical societies have a clinical meeting once a month to take the place of the regular meeting. Such meetings are held in the hospital, and certain cases of interest in the hospital or in the community at the time are presented and the points of interest discussed. It is now generally recognized that, in order to maintain interest in medical meetings, particularly in the county and district meetings, there must be a clinical side to the program. A discussion of clinical topics stimulates the men to make more careful examinations, and to keep better records, so that their contributions to medical meetings may grow in importance.

*President's address before the Minnesota State Medical Association, St. Paul, October, 1923.

Eighty-one of the eighty-six counties in Minnesota have organized county medical societies. The five counties that have no medical organizations are not in the rural districts, but close to the larger cities, and many of the physicians attend meetings in the adjoining county, so that it can be said that practically every county in the state has an organized county medical society or offers opportunities for its physicians to attend medical meetings. August 1, 1923, 1,854 of the 2,774 physicians in the state were members of the State Association. The numbers, naturally, fluctuate from day to day because of deaths, changes of location, and the entrance of recent graduates. The number of physicians in the state is increasing considerably each year.

### COÖPERATION WITH THE AMERICAN MEDICAL ASSOCIATION

The contact of the State Association with the American Medical Association comes through two delegates who are elected each year. Dr. J. W. Bell and Dr. J. L. Rothrock, who have been our delegates to the national meetings for many years, have rendered important service in aiding to meet the problems that have arisen, and to work for proper legislation. The State Association is also to be congratulated in having had Dr. McDavitt, a member of long standing and a former secretary, on the Board of Trustees of the American Medical Association for so many years. Our society is justly proud of the work he has done. It may be difficult for the members of the House of Delegates of the State Association to keep in touch with the problems of the American Medical Association, and yet I believe it should be the policy of the Minnesota Medical Association to instruct its delegates to bring up matters of importance before the national organization. It is only through our delegates that we may come in contact with the national organization, and be given an opportunity to institute, or at least to influence, medical legislation.

### EXTENSION OF MEDICAL KNOWLEDGE; ADVANCEMENT OF MEDICAL SCIENCE

According to the constitution of our association, it is our duty to impart medical knowledge to the public, to advance medical science, and to elevate the standard of medical education. Every physician who so desires may keep abreast of the times through medical journals, society meetings, clinics, and demonstrations. The extension of medical knowledge to the public is probably best accomplished by means of the associated press. We are prohibited by our code of ethics and the principles of honesty from advertising in the newspapers, but we should make more use of the medium of newspapers for distributing important facts with regard to medicine and public health. Under the supervision of committees or associations of medical men, this is now being done without violating our code of ethics. Those who are responsible for the policies of the newspapers are, of course, anxious to publish truthful news with regard to medical facts which are of interest and importance to the public, and many newspaper organizations are now having such news items reviewed, and corrected if necessary, by a committee of competent men before they are published. A great deal of this work is being done at the headquarters of the American Medical Association, and credit should be given to the officers of the Association for instituting this important propaganda for the extension of medical knowledge. The publication of journals by medical associations for distribution to the general public is a new part of the plan. The American Medical Association publishes and distributes each month 30,000 copies of such a journal. A similar journal, which is justly receiving favorable comment, is being published by one of our state societies. Possibly it is too soon to estimate the value of these publications, but even in this short time the outlook is promising and undoubtedly will become more so with wider distribution.

One of the vital reasons why the medical profession should strive to impart information to the public with regard to public health matters is to offset the influence of the charlatan who advertises in the newspapers as the physician cannot. It is not alone the uneducated and unintelligent class who need this information. Some of our most highly educated and presumably most intelligent citizens often become victims of the charlatan. The machinations and the patent medicines used by various cults for the cure of ailments and complaints are all made very alluring, and demonstrate the reason why these cults have such a large following. No doubt many of these patients are treated in perfect sincerity and the fact that chronic ailments have disappeared as though by magic has been as convincing to the healer as to the patient.

So long as human nature is human nature, and so long as hysteria and neurasthenia prevail in association with human ailments, just so long will all varieties of symptoms continue to be apparently cured by magic. The medical profession can accomplish little by condemning and ridiculing such methods; their strength must lie in the patient and persistent explanation of plain facts with regard to disease, which have in the past, unfortunately, been surrounded by mystery. While it would be unbecoming for members of the legitimate medical profession to become agitated over the activities of the charlatan, nevertheless his influence on medical practice should not be ignored. We should, as I have said, endeavor to present our information clearly and from a practical standpoint to the lay public, at the same time endeavoring to attain greater perfection in the practice of our profession. We must face the fact that the charlatan has attained his present position partly as a result of our failures and neglect of the everyday humanities, which may mean more to the patient than the achievement of a brilliant result medically, and partly because, although we have graduated from reputable medical schools, are thoroughly competent to make complete examinations, and to interpret the findings, we do not always take time to do it, and thereby overlook an easily recognized ailment.

Since the beginning of the history of medicine in this country we have asked, "What will become of the medical profession as the result of the activities of quacks?" We have regretted the loss of esteem for the profession and have bemoaned the fact that physicians in the rural districts were moving to the cities. In an interesting address before the Tennessee State Medical Association this year, Dr. Olin West, Secretary of the American Medical Association, dealt particularly with these problems. He said that, after making a detailed study of the minutes of the first meetings of the American Medical Association, he was convinced that few of the problems, real or fanciful, which agitate us or arouse our fears, are at all new. He quoted from the address of the first President of the Association (1848) as follows: "The profession to which we belong, once venerated on account of its antiquity, its various and profound science, its elegant literature, its polite accomplishments, its virtues, has become corrupt and degenerate, to the forfeiture of its social position, and with it, of the homage it formerly received spontaneously and universally." Seventy-five years ago, at a meeting of the American Medical Association, in Baltimore, the fact that physicians were leaving the rural districts for the larger cities was discussed at great length. At this same meeting a committee reported, "Quacks and irregular practitioners swarm like locusts in every part of the country."

It is comforting to know that our problems are at least no worse than when the profession was first organized in this country; in fact, that, in spite of the pessimistic attitude taken by some of the leading members of the profession at that time, we seem to have progressed somewhat toward the solution of the problem, and our progress has been more rapid in recent years. I am inclined to take the cheerful view that the medical profession is greatly respected by the lay public and that our efforts to advance in knowledge and attainments, to the end that we shall be better able to care for their ailments, are appreciated.

So far as I have been able to learn, our rural districts are, in general, well cared for. However, I believe conditions could be improved by the establishment of more community hospitals. Such hospitals naturally attract more able men since they are thus enabled to do better work. As has been emphasized, it is difficult for a physician practicing in a large rural center, without the use of a hospital, to maintain enthusiasm for improving his work, or to hold his interest in modern medical problems. These physicians, having begun the practice of medicine with the highest ideals, must strive constantly not to reduce their work to the mere effort of making a living. The medical profession should make an earnest effort to be of service to these men by establishing hospitals in their communities. Furthermore, they should be encouraged to attend medical meetings and to take part in them, and our state association should make it as convenient as possible for them to attend clinics and to hold meetings in their own towns. While much progress has been made along these lines, yet there should be still further stimulus to encourage physicians to continue to study and to undertake practical problems of research. The routine practice of medicine, under certain circumstances, may become most uninteresting. Although it is not ordinarily practical for the general practitioner to

carry out experiments which necessitate operating on animals, he may study special groups of cases in which he is particularly interested. The more time one devotes to a subject, the more one finds to learn, and the satisfaction of learning is correspondingly great. It is a matter of interest and pride that insulin, probably the most important discovery of many generations, was discovered by a young teacher and general practitioner. The actual results of most experimental research are probably not of great value, but the performance of these experiments requires independent thinking, which makes bigger men. It is probable that the most important investigative work will be carried on by practitioners who have had wide experience in the problems involved in the human side of the practice of medicine.

To return to the subject of charlatanism, it is satisfactory to note that the cults have not increased in the last seventy-five years. President Wilbur believes that when every student receives some training in biology, the patent medicine cheat, the rubber and the manipulator, and the knotted string faddist, will have less fertile soil for their mushroom activities. Everyone who has made a serious study of the problem seems to agree that it is a matter of education of the general public along the lines of medicine and public health, and that it is the duty of the profession, through the activities of its societies, to carry out such educational propaganda. Several plans were presented and discussed at a conference of state secretaries this year. In Michigan it was decided to establish a committee on public education, originated by the Michigan State Medical Association. The committee embraces in its membership representatives from the State Medical Association, the University of Michigan, including the Extension Department, its medical and hospital staffs, the State Department of Health, the State Dental Association, and the Detroit College of Medicine. Speakers are sent on request to any place in Michigan. The Extension Department of the University helps to pay the expense of these speakers. The committee has apparently just begun its work and it may be some time before the results of its activities are realized, but thus far the members are very enthusiastic over what has been accomplished, both from the standpoint of publicity and the elevation of medical standards.

The second plan, which was discussed at the conference of the secretaries, is in operation in Colorado and California, under the name of the Public Health League. In Colorado this body acts as an intermediary between the State Medical Association and the public. The League is composed of lawyers, merchants, ministers, and physicians, the laymen being in the majority, and they are gradually becoming the most enthusiastic supporters of the movement. The League has functioned most satisfactorily for about one year.

The third plan was put in operation in Iowa, largely due to the activities of Dr. Macrae. There is a field activity committee, consisting of the President of the State Association, two members selected by the council, one from the State Board of Health, one from the Faculty of Medicine of the University, one from the Iowa State Tuberculosis Association and one a state social worker. Thus there are seven men on the committee, five of whom are members of the State Medical Association. The problems undertaken are (1) the distribution and delivery of medical service, (2) the adequate provision of good hospitals, (3) the establishment of county public hospitals, and (4) the solution of health problems in schools. The Director of the Field Activities Committee devotes his whole time to the work. He has visited societies and clubs throughout the state, and up to the present time it is reported that he has discovered many matters of importance that need to be corrected. The expense of carrying on such work is great, and the activities of the committee have been limited by insufficient funds.

A fourth plan, an organization in Idaho, is operated by the League for the Conservation of the Public Health of Idaho. The secretary writes: "The League is somewhat different from the Medical Society in that it is larger in scope and handles problems that could not be touched by a medical society. In other words, the League takes care of the publicity, political and legislative end of the game, while the Society handles the scientific and ethical side." He feels that the League has an advantage over a medical society since it may take part in all public health questions, and since the membership includes everyone interested in the betterment of public health, whereas the membership of a medical society is limited to medical men. As an illustration of the League's function, he cites

the passage of the licensing law, concerning which there has been a misconception on the part of the public to the detriment of the medical profession. "Any public health law, and this includes the licensing law, is passed in the interest of the whole people; this has been held in hundreds of supreme court decisions. As a matter of fact, a law put through to benefit a certain profession or a class would be unconstitutional, and the supreme courts have held that all public health laws, while they have been fostered by medical men, are placed on the statute books for the benefit of the people. It is, therefore, one of our aims to interest the people in matters of this kind." There have been over 900 court decisions pertaining to licensing matters handed down by our various supreme courts. A misconception has arisen that the profession is doing this for their own benefit. The secretary of this league believes that their great work in the future will be to start health columns in the daily, weekly, and monthly papers, in order to give the public the benefit of the knowledge acquired by the medical profession. Under conditions of such complete frankness there will naturally be a better understanding between the public and the profession. Active membership in the Idaho League is limited to medical men, and the secretary feels that the control of the League should be kept in their hands. The regular members pay a definite membership fee, while the associate members pay any sum they desire.

In an endeavor actively to relate public health to the welfare of the state, Governor Smith of New York invited representatives of the medical profession from every section of New York to act as an advisory committee to the governor, this committee to investigate and report on rural health conditions and facilities, medical education, medical research, the Medical Practice Act, and narcotic drug problems. The action of Governor Smith in bringing into existence such a committee was endorsed by the House of Delegates of the American Medical Association.

We all recognize the necessity of a closer relationship between the public and our profession, and a consideration of the foregoing plans would seem to indicate that more can be accomplished by organization than by endeavoring to demonstrate to state legislators the importance of what we are trying to do in the interests of public health. While these various projects for the purpose of obtaining better contact between the state medical association and its component societies, between the state association and the national organization, and between all of these organizations and the public, have not been in existence long enough to justify a definite prognosis with regard to results, they nevertheless suffice to encourage further effort along these lines, not only by a few of the medical profession, but by all.

In view of the work being done in other states, it seems to me we should lose no time in appointing a committee from among the members of the Minnesota State Medical Association to study the plans of the various organizations now in existence, and later to formulate such an organization as may seem best suited to corresponding work in our own state.

### STANDARDS OF MEDICAL EDUCATION

One of the accomplishments of which the State Association may be justly proud is the elevation of the standards of medical education. The requirements for entrance to the Medical School of the University of Minnesota are as high as in any medical school in the country, and as a result of the plan formulated by the State Board of Regents for medical training for graduates, we now have one of the best schools in the country. Because of the fact that the state has but one medical school, we are in a closer medical and social relationship, which is so essential and valuable in preventing petty differences.

Wilbur says, "The success of modern men in medicine must rest on these factors of safety given by Allbet as the guides of the wise Greek physicians of more than 2,000 years ago. The first is freedom from magic, the second is mastery of hygiene, and the third is that, in spite of abstract notions, never to forget to treat the individual."

Methods of treating human ailments have changed and will continue to do so, but our aims have not; they still revolve around the individual relationship of physician to patient. All of these various functions have been made a part of our constitution, so that in following and developing them we may become capable and honorable, as well as more useful to the public in the prevention and cure of disease, in the palliation of incurable diseases, and in the prolongation of human life.

# THE TREATMENT OF TUBERCULOSIS*

H. Longstreet Taylor, M.D.
*St. Paul*

Tuberculosis in man is a disease more or less localized in certain organs but with a strong tendency to become generalized. On account of this apparent predilection for one organ or another it is usually spoken of as glandular, pulmonary, intestinal, abdominal, surgical and so forth, and the probability or even possibility that it may be much more widely distributed than the symptoms indicate is overlooked.

For half a century pulmonary cases have been classified as in the first, second or third stage by the extent of the lung involvement, without regard to the fact that ulcerative intestinal tuberculosis carries off half or more of the fatal cases of so-called pulmonary tuberculosis. The extension of the tuberculosis to the intestinal tract and other abdominal organs is often unsuspected until revealed as the real cause of death on the post-mortem table. In fact the death certificate of many of these cases should read, intestinal tuberculosis complicated with old pulmonary tuberculosis. This is rendered all the more possible because ulcerative intestinal tuberculosis may give neither signs nor symptoms of its presence.

This digression from the subject of the paper has been made to illuminate the statement that tuberculosis should be regarded as a general disease, and that its treatment should not be undertaken until the presence of tuberculosis has been excluded from one organ after another and the final diagnosis locates its distribution with accuracy.

No case should be accepted as a case of surgical tuberculosis, for example, without a complete physical examination including stereo-plates of the chest and fluoroscope study, with plates of the intestinal tract, aided by the barium meal and the opaque enema. Early diagnosis has long been heralded as the prime requisite to successful treatment. Let us amplify this by saying that both an early and an accurate diagnosis is the first essential to success.

The past forty years have witnessed the most intensive work upon the subject of tuberculosis that the profession has ever given to this most interesting and important disease. We believe that certain fundamentals have been so universally accepted, as the result of this work, that they should be regarded as the permanent foundation of our treatment.

This foundation has been gradually developed from different methods of treatment, but no useful system has been suggested, unless certain cornerstones have been used in conjunction with it; and they are rest, fresh air, food, and discipline.

Conscientiously and intelligently used, under constant skilled supervision, these simple methods are usually sufficient in uncomplicated cases to carry the patient over the danger line if supplemented with such adjuvants as the physician may deem necessary to meet any threatened emergency.

The most prominent additions to the universal foundations referred to above are chemo-therapy, tuberculin, heliotherapy (including the different lamps), pneumothorax, and surgery.

Rest has been a recognized therapeutic agent for generations. Weir Mitchell understood its importance in chronic diseases, and worked out the method of its use in neurasthenia and allied conditions in the seventies.

Rest must be both physical and mental; and, as Allen K. Krause says, should include the "relief from strain" that is embraced in the idea of absolute rest.

The patient must be so instructed that he will never allow himself to get tired, but will accept the first hint of the approach of fatigue as the signal of danger, and immediately take refuge in rest.

Rest of the body as well as of the mind is essential, even when the tuberculosis is localized, and when rest of certain parts is indicated. When a single joint or the spine or a pleuritic side is clamoring for a splint, give it the necessary supports, but at the same time immobilize the entire patient. Put the larynx to rest by interdicting the use of the voice, but do not nullify the local gain by allowing the patient to be up and about.

Absolute rest in bed is the most reliable remedy against the daily rise of temperature, for the racking cough and weakening sweats, loss of appetite and disordered digestion, as well as the annoying neuralgias of the intercostal nerves and those of the

*Presidential Address to the Minnesota Academy of Medicine, September 19, 1923.

abdominal parietes of the sufferers from tuberculosis.

The full therapeutic results from rest are not obtained unless the remedy is used continuously and intelligently until the ends sought for are realized. As the prognosis in pulmonary tuberculosis is the most uncertain and difficult chapter, so is the length of time the rest treatment must be carried out impossible to determine in advance. While one patient whose disease runs on smoothly to a satisfactory termination may be allowed to leave his bed in three or four months and begin the last division of the treatment—namely, exercise—another, who may have been admitted under the same classification, but who has developed various complications, will be found in bed after the lapse of eighteen months or two years, and yet may eventually be discharged as an arrested case. The successful use of rest implies its administration in liberal doses over a long period of time, without any intermissions. The essential elements in the success of the rest treatment are that the physician be firm, and the patient be determined to recover. No lapses from it may be indulged in without the danger of a relapse with more or less serious consequences to the patient.

The co-operation of the patient is a *sine qua non*. Recovery from tuberculosis shows that the patient is full of grit and determination, that present desires and comforts have been disregarded for future rewards. The fact is that recovery from tuberculosis is equivalent to a certificate of a strong character. The successful struggle for health prolonged through months and even years presupposes an unusually close co-operation between physician and patient. The patient must be convinced that the physician is pointing out the right road and there must be no doubts or misgivings on the patient's part if the road is to be followed to its termination. The patient must be willing to submerge his own theories and must whole-heartedly accept those of the physician, and this through a long vista of days and weeks and months extending oftentimes into years. How evident it is that the physician must know how to get the patient's confidence and how to keep it, and also that often as much credit for the ultimate victory belongs to the one who points the way as to the one who has had to endure the mental and physical stress and hardship.

Just here a few words on the subject of the length of time that should be given to the successful treatment of a case of tuberculosis. Given a case of tuberculosis of a joint and every surgeon at once says that three years will be necessary to effect a cure. But how few are willing to acknowledge that as much time should be given to a case of pulmonary tuberculosis, a much more dangerous and widespread pathological condition than the tuberculosis of a single joint.

The subject of rest cannot be closed without speaking of exercise.

When a patient has been strictly confined to bed for a long time it is not a simple maneuver to get him up and on exercise without bringing on a relapse.

When the pulse and temperature have been running along within normal limits for some time the first exercise is embodied in the bathroom privileges, so highly prized by patients. If this does not cause an increased amount of sputum, and acceleration of the pulse, or a daily rise in temperature, the further privilege of a single meal a day in the dining room is added. If everything continues to improve, a second and third meal is allowed at intervals of a week or two. Then the patient is given a walk out of doors of five minutes' duration once a day. Immediately after this walk pulse and temperature are recorded. Half an hour's rest on the bed follows, when pulse and temperature are again recorded. Both pulse and temperature are increased by even slight exertion, but if they have subsided at the end of thirty minutes then walks should be continued, and the amount of exercise very gradually increased. At the end of a week a five-minute walk may be added in the afternoon. Each week five minutes are added to the morning and afternoon walks.

This gradually increased exercise goes on unless the amount of sputum increases, fistulæ reopen and discharge pus, the pulse beats faster, the temperature mounts above normal, or the patient feels fatigued. Then the patient goes back to bed and to absolute rest and again begins gradually to exercise after the disquieting symptoms have disappeared.

When the patient is able to take a two hours' walk in the morning and two hours in the afternoon he should be discharged. But this discipline has taught him many things. He has learned that the way of the invalid back to health is hard. He appreciates his health, and does not take it for granted, as he did before he lost it.

Unfortunately the great majority of the patients soon imagine that they have learned how to live; that they know how to take care of themselves; that all these rules are not necessary in their particular case, and so they go forth to reap a harvest of relapses and all too soon to occupy a consumptive's grave.

Fresh pure air, free of dust, smoke and all gaseous impurities is a very important element, especially for the relief of cough. The mantle of heavy smoke and fog seen over large industrial centers often contains most irritating sulphurous fumes, considerable quantities of soot, and other products from the imperfect combustion of fuel and from chemical factories.

In addition to this there is not an inconsiderable quantity of carbon monoxide from the engines of automobiles and trucks. When we consider that every automobile produces from one to two cubic feet of carbon monoxide gas per minute, sufficient in a small closed garage to asphyxiate a man in five minutes, it does seem highly probable that in districts where the traffic is heavy, some deleterious effect must be produced upon people living on congested thoroughfares. The headache of carbon monoxide poisoning is an oxygen deficiency symptom, demonstrating the action of the gas. The noises inseparable from large concentrated populations increase nervous tension and strain, and disturb sleep.

The patient in his home or in a hospital in town is subject to the intrusion of too many relatives and friends. Their visits often break into the prescribed rest hours, they seldom are convinced that their talk and even their very presence is putting the patient under a strain, and the unfortunate patient is seldom allowed to have them sent away without seeing them.

From such considerations as these it is very evident that it is highly desirable to remove these patients from crowded centers of population into the relatively pure air of the country with its quiet nights.

A patient removed from the usually ill ventilated bedroom of home and put in bed with pure country air constantly changing around him throughout the twenty-four hours, soon notices a feeling of renewed well-being. The cough and amount of expectoration diminishes, night sweats disappear, fever is lessened, and appetite begins to reassert itself. The chemists have not been able to determine the particular ingredient of the air of overcrowded apartments that makes heads ache and brains cerebrate slowly and with difficulty, and yet there is undoubtedly something that does these things and that does make a cough much more troublesome than it would be in the open air. Take the example of the open air school. Children in an open air school whose day is not more than two-fifths as long as the ordinary school day, accomplish as much in a year as their fellows who have put in the full time daily in the crowded schools. And this, in several schools with which the writer is familiar, without doing any work out of school, and in spite of the fact that these schools are only open to subnormal children.

Such considerations as these certainly outweigh the fact that investigation has not been able to define the difference between the air of a closed or only partially ventilated apartment, and that of the freely moving air out of doors.

Anyone who has for years seen the marvelous change wrought in patients by a simple rest cure in the open, cannot but have a most abiding faith in the potent qualities for good, inherent in the pure fresh air of the great open spaces.

Little need be said about food, except to state the present attitude toward the overfeeding of the past. Five or six meals a day were the rule. The patient was encouraged to swallow as many as a dozen raw eggs in milk in the twenty-four hours. In one institution trays were set before patients every four hours and the attendants were not allowed to remove them until every particle of the weighed out portions were swallowed. Emesis followed so often that the basin accompanied the meal as regularly as the stewards on passenger ships produce them when the ocean is even moderately rough.

Derangements of the digestive organs and functional albuminuria have shown the errors of this system, and now patients are given three meals a day of an easily digestible and attractive character, and eggs and milk, while still much used, are not hedged about with myths of any specific medical property such as they were formerly credited with, especially in the anti-tuberculosis propaganda of twenty-five years ago. Lunches between meals are ordered if indicated, but are the exception, not the rule.

Discipline is the mortar which binds these various bricks together. The patient must be made to understand that however trivial the regulation may appear, success can only be obtained by absolute obedience to every rule in the system. Here the character of the patient shows itself. If willing to be convinced and to forego the pleasure of improving upon the instructions given, or in other words to accept the authority of the physician and to be guided by it, then the cure is made easier for both parties, and no costly relapses are induced by the apparent determination of the patient to get well his own way, or not at all, a state of affairs only too often met with.

In a sanatorium, discipline is more important than a drug room, and if successfully enforced makes the drug room almost superfluous. Discipline is enforced with difficulty even in a sanatorium. In treating patients in their own homes it is usually very good whenever the physician happens to be in the house, seldom during his absence.

The sanatorium should be a school in which all of its inmates learn proper methods of living both to guard their own well-being and to protect others from infection in case they return to their homes and resume their previous occupations as open cases or tuberculosis carriers.

This knowledge cannot possibly be imparted to a patient in a residence at the sanatorium of a month or so. It must be so thoroughly acquired that the new ways of living, the changed attitude toward so many problems, have been grafted deeply into their very beings and have been dignified by being admitted to those deeply rooted habits which govern our individual relations to the world. If the discripline of the sanatorium is to successfully form new habits in its inmates, time is the most important element, and when patients are in condition to be discharged, or such of them as are fortunate enough to make a relative recovery, these habits will have become an integral part of each individual. If looked at in this way there can be no argument as to whether the sanatorium should be a school for the tuberculous, or a place in which they are to seek for a cure, as both of these objects are usually attained together. Just a smattering of the hygienic requirements of the case are worse than useless, and unless these lessons in proper living are thoroughly assimilated, the results are often ridiculous in the extreme and the teachings of the false prophets who have been to this or that sanatorium for a month or two, and who imagine that they know it all, would astonish their teachers beyond measure by their positive statements often exactly opposed to the principles sought to be instilled.

After this tedious statement of the obvious and commonplace in the management of this most chronic of diseases, let us turn to themes of a more argumentative character.

The chemo-therapy of tuberculosis is a subject as old as the history of the disease and to date wholly unsatisfactory.

It is so from the nature of the defences with which the bacillus of tuberculosis is surrounded, in contradiction to the parasites, trypanosomes and spirochetes, which circulate freely in the blood stream and are not protected by a fatty and waxy envelope and which can be effectually killed therapeutically without injury to the host. It is most astonishing how many ways have been suggested, within the memory of the writer, of overcoming the bacillus of tuberculosis within his citadel, and how their very names have been forgotten after a short period of enthusiastic experimentation.

The bacillus, it was declared, could not survive a temperature that the host could readily endure; therefore let us sterilize the lungs by breathing in heated air. Here is a gas that kills the bacillus in a test tube. Let us fill the large intestine with this gas and thus sterilize the patient. Here is creosote. The bacillus of tuberculosis can not grow with a very minute quantity of it in the test tube. Turn the patient into a test tube, fill him up with creosote until every secretion and excretion of his body reeks with the poison. Here comes Shurley and Gibbs with solutions of iodine in one bottle and gold in another. Injected bravely and in sufficient quantity the bacillus must surrender. And so on *ad infinitum*.

Of more recent years a tremendous amount of work has been done by research workers in the hope of finding some specific for tuberculosis. For example the great volume of research on this subject that has been issued from the laboratory of the Sprague Memorial Institute of Chicago.

Chaulmoogra oil and its derivatives has scored such a triumph in leprosy that workers in tuberculosis have naturally turned to it in the hope that it might solve the tuberculosis problem as it has that of leprosy. No positive results have yet been re-

ported. The staff of Pokegama Sanatorium are using it both on animals and in a few carefully selected cases. As in leprosy the injection of the chaulmoogra esters are well borne by patients and some of those thus treated have done remarkably well. Its topical use in laryngitis has often controlled pain but has not had any curative action on the local tuberculosis. A detailed report of this work will be made in due time.

Tuberculin has had many ups and downs in its checkered career, and to this day the discussion of the best preparation and how to use it monopolizes about half of the space in the German special tuberculosis publications.

The writer has used tuberculin for thirty years, and is convinced that it is exceedingly useful in assisting fibrosis and maintaining a high degree of immunity for many years, if used after all acute symptoms have been controlled. Given to children with positive von Pirquet reaction, this result is especially marked.

In latter years very few sanatorium patients have been given tuberculin because the rest treatment alone, given as it can only be in a sanatorium, seems able to accomplish as much as could be expected from the added use of tuberculin.

This statement may soon have to be retracted and tuberculin once more reinstated at the top of the list of remedial agents if the reported success of a new antigen suggested by Professor Dreyer, Pathologist of the University of Oxford, England, be found upon investigation to be all that the first reports claim. His method differs from the innumerable ones that have been used previously in that he first robs his bacilli of their fatty and waxy coat of mail. The bacilli are treated in formaldehyde and then the lipoids are extracted with acetone in a Soxhlet apparatus. The antigen is then made in the usual way from the bacillary bodies minus their protective coats.

Let us hope that Professor Dreyer has succeeded in giving us a specific vaccine whose use will be followed by as great a measure of success as has attended the use of vaccines in so many diseases. The reports of its successful results in the treatment of infected guinea-pigs, and from a London hospital of its use on some sixty patients, are most encouraging.

Heliotherapy was used by the ancients and during the past century has been gradually reinstated in favor. It remained for Rollier to demonstrate its great value in the cure of surgical tuberculosis in his sanatorium established in 1903 at Leysin, Switzerland, at an altitude of 4,000 feet.

Rollier shows in his recent book on heliotherapy that it is a local treatment which is at the same time analgesic, bactericidal and a powerful stimulus to cicatrization; that it aids and consolidates the cure; that it does away with mutilating operations; and that exposure to cold air raises and maintains high metabolic activity.

At the present time heliotherapy is being used with great advantage in the low lands as well as in the mountains. This has been rendered possible by the use of the quartz lamp, especially in localities that are not blessed with as much sunshine as is usually found in high altitudes. By using the lamp in very cold weather and on cloudy days the treatment becomes possible everywhere, and crippled children can be given its advantages near their homes wherever they may be located.

The sun and the lamp have proved to be a wonderful combination, and while not able to accomplish as much as Aladdin and his lamp, yet they are truly invaluable in the treatment of tuberculosis. All bone and joint tuberculosis, sinuses and fistulæ, glandular, pleuritic, and last but not least, even abdominal and ulcerative intestinal tuberculosis yield to their magic power, if that power is applied in the beginnings of these conditions. Even magic is powerless in extremis.

Rollier says pulmonary tuberculosis is no contraindication to heliotherapy even in cases with a tendency to hemoptysis, but the treatment must be applied in a careful and circumspect manner.

Dr. Pryor and La Grasso at Perrysburg have shown that the supposed danger of heliotherapy in surgical cases complicated with pulmonary tuberculosis is a myth. At Pokegama no harm has ever been done to carefully selected pulmonary cases by sun exposures, but very often marked benefit has resulted. Patients who have much fever with toxemia, in other words far advanced cases with a bad prognosis, must never be given sun and air baths.

Allen K. Krause says, in speaking of pneumothorax, that it is the one outstanding advance in the treatment of tuberculosis since the discovery of the bacillus in 1882.

An artificial pneumothorax splints the lung and

thus holds it at rest. While physiologically active the lung cannot know rest. Like Saint Nicholas' little round belly, which "shook when he laughed like a bowl full of jelly," the lung is a most unsteady organ, expanding or contracting in never ending cycles, and a most pronounced heretic when considered from the standpoint of the gospel of rest. However, when a satisfactory collapse has been secured, the heretic is handcuffed and securely bound in one place where it may be held for months or years if it seems necessary.

An ex-Pokegama patient, whose collapse was indicated by a hemorrhage that kept on in spite of anything that could be done to control it, is now in the fourth year of his pneumothorax. He has been actively engaged in business for eighteen months. Since the lung was collapsed there has been no recurrence of his hemorrhages.

In serious hemorrhage cases artificial pneumothorax scores its most signal triumphs by collapsing the cavities and giving nature's hemostatics an opportunity to perform their various functions efficiently.

Widespread strong adhesions over the diseased portion of the lung often prevent any satisfactory collapse around the seat of hemorrhage, even if the collapse of other portions of the lung has made it possible to introduce quite a quantity of air. Fluoroscopic control at the time the collapse is made thus becomes of the greatest importance.

Collapse is also indicated in one-sided rather acute tuberculosis. The other lung must be free of râles and extensive consolidations, and the abdominal organs must be above reproach symptomatically and negative to *x*-ray examination aided by barium meal and enema. Under these conditions the patient usually improves rapidly. The expectoration ceases, fever recedes, appetite and a feeling of well-being take the place of the lassitude of the rapidly failing patient whose constant cough and excessive expectoration had used up every bit of energy and strength he possessed. The rapid improvement of properly selected cases is most gratifying and makes one quite willing to agree with Krause in his praise of the procedure.

Artificial pneumothorax should never be induced, except to control hemorrhage, without a full understanding with the patient that it must be maintained for a least a year, and often longer. The latter part of this period the refills are usually a month apart, and the patient reports to the physician's office at regular times, where the air is introduced and the return home promptly follows.

The physician who cares for tuberculosis in its manifold manifestations has frequently to call on the surgeon for assistance. Glandular tuberculosis except for cosmetic reasons should not be considered an indication for operation. The operations on cervical glands, at one time so popular, have been abandoned by most surgeons as futile, since the operation from the very nature of the case can never be complete and recurrences are always to be expected.

The same may be said of resections of tuberculous intestines, which was always accompanied by such a high mortality that it could not have become a popular procedure either with physician or surgeon. Now that the lamp promises a considerable measure of success its use will probably supplant the operation entirely. As Lawrason Brown says, the lamp is at least not accompanied by such a large initial mortality.

The orthopedic surgeon is in reality a tuberculosis specialist, so largely are his patients the victims of a general tuberculosis more or less localized in the bones and joints. The hospitals for crippled and deformed children should all primarily be heliotherapy institutes, helped out in this northern climate with quartz lamps. At the Rollier sanatorium operations have been reduced to a minimum, mutilations are avoided, articular function is seldom lost, and it is his special pride to return his patients to the world as complete individuals capable of a normal existence.

Old cases of empyema require surgical treatment. For this class of deforming chronic inflammations within the thorax Dr. Emil Beck's skin sliding graft meets the conditions and secures the best end results with less deformity than any other surgical procedure.

There is a large class of cases which would be suitable for artificial pneumothorax, but on whom it is impossible to do a collapse on account of adhesions between the two pleural layers.

The operation of extra pleural thoracoplasty fills the same indications as pneumothorax and offers these patients a means of escape.

K. Turban was the first to remove sections of a number of ribs in unilateral pulmonary tuberculosis. This was in 1899. Some years later experi-

ence with pneumothorax treatment showed that to be successful the collapse of the lung must be complete. The present operation answers this requirement quite fully. Modern thoracoplasty is a European operation, and to European sources we must turn for statistics. Brunner reports that in 381 cases, 35 per cent were apparently cured by operation. In 116 recent cases at Munich 66 per cent were successful. Prof. Sauerbruch's operations total over 500 cases, and Wilms has also operated on as great a number. (Archiv. für klinische Chirurgie, Berlin, 1922.)

Dr. Archibald, of Montreal, has operated often and was probably the first surgeon on this side of the Atlantic to take up the operation.

The operation consists of the removal of a section of each rib from and including the first to the tenth. The resection must be made very near the vertebral articulation. From one to two or three inches are taken from each rib, the shorter pieces from the upper ribs. This allows the side to be flattened in, as the anterior end of the rib is not as immovably fixed as the posterior is. The operation should be done under local anesthesia, and to keep the initial mortality low should be done in two or more stages.

One of the most serious complications of tuberculosis, and quite a frequent one, has been the combination of diabetes with tuberculosis. For these unfortunates a new hope seems to be shining on the Eastern horizon, for the use of insulin with sanatorium régime has worked wonders in cases that were not hopelessly advanced before beginning treatment. At Pokegama we are most enthusiastic over results so far attained.

*And now we have all of these, but the greatest of these is rest.*

## STUDIES IN THE COMPARATIVE VALUES OF MOUTH AND RECTAL TEMPERATURES —A PRELIMINARY REPORT*

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What we consider fever has been the index to man's well-being since the beginning of medical history, and as we pass through the ages and read medical literature we find that fever is one of the cardinal symptoms of all diseases. In fever, the physician sees not only a feature of the disease calling for treatment on its own account, but he recognizes in it an indication of an underlying intoxication.

The methods of ascertaining whether an individual had a fever were varied. The ancients used a very unreliable method, that of touch, placing their hand upon the body, usually the forehead. Today, we use an instrument supposedly of precision—the fever or clinical thermometer—to register the body's temperature. These thermometers have been perfected to register temperature in one to two and three minutes.

Temperatures are taken for various purposes: (1) for diagnostic purposes; (2) as a guide to treatment; (3) merely as a matter of record.

In taking a temperature, no matter for what purpose, accuracy is the keynote. If it is worth while taking, it is worth taking well.

Some of the factors which must be taken into consideration in obtaining a temperature reading are: the thermometer itself, infancy and senility, the presence of throat infections, abscess formations, unconsciousness, excitement and exercise, the ingestion of hot or cold liquids, the honesty of patients and the ability of patients to take their temperature accurately.

Different authorities accept different normal standards. Dr. H. A. Bray cites the following in his article on "Fever in Tuberculosis":

Wunderlich, axilla 99.94° F., mouth 99.3° F.
Vierordt, mouth 99.6° F.
Turban, mouth 98.9° F.
Stewart, axilla 99.5° F., mouth 99.1° F.
Foster, axilla 36° C. to 37.5° C., mouth 0.25° to 1.5° C. higher than axilla.
Finlayson, mouth 98.6° F.
Sahli, mouth 99.32° F.

Quite a variation, but what does it mean? There is no accepted standard for fever or for method.

There are several advantages and disadvantages for each method. Too much stress cannot be placed upon the importance of technique and the thermometer used in recording the temperature reading.

In our sanatorium, and I suppose in other sanatoria like methods prevail, we allow our patients (unless they are very sick) to take their own temperatures and report the readings to the nurse as

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she makes her rounds for such purpose. She then records them. In another sanatorium with which I am familiar, they allow one patient to take the temperatures and this in turn is reported to the nurse, who makes the necessary record of the same. These methods are not very exact, and the honesty of some patients can be questioned, particularly where the patient is reluctant to go to bed.

Some objections to mouth temperatures to be considered are: extra large nasal passages, coughing, drinking hot and cold liquids immediately before taking temperatures, infants, aged and the unconscious, the position of the thermometer in the mouth (whether under the tip or back of the tongue), and whether the lips are tightly compressed.

The objections raised to rectal temperatures are: (1) patients, on exercise, returning from their walk or work find it a nuisance to remove their clothing in order to take the temperature; (2) local heat around a rectal abscess will raise temperature; (3) some patients with hemorrhoids complain of pain while inserting the thermometer.

Axillary temperature cannot be taken to advantage. In case of unconsciousness, perhaps yes, then in a fat person only, but certainly not in children or emaciated people.

When temperature is being taken per rectum, it is absolutely necessary for the patient to lie down and remain quiet while the thermometer is in place. Then we know that a patient is at rest while the temperature is being taken. The same cannot be said of mouth temperature, for patients can walk around while they are taking their temperatures, and do. They talk and the lips are not in constant contact and false readings are obtained.

Then again some patients (unless they are watched) are so apt to remove the thermometers from their mouths to note the readings and just as soon as the mercury reaches normal limits they report the temperature as normal. These conditions do not take place with a rectal reading.

Waiving all usual methods and the likes and dislikes of the person taking the temperature readings, it is an accepted comparative standard that rectal temperature is 1° higher than mouth and the axillary 1° lower than the mouth in the same person. To establish definite relations between mouth and rectal temperature is in part the purpose of this paper.

In determining the temperature variations in these cases, the natural method of pursuit was merely to take temperatures at our usual time, 7 A. M., 3 and 7 P. M., as was our custom, and merely take an additional mouth temperature at the same time. The patients were cautioned as to talking, compressing lips tightly, drinking hot and cold liquids immediately before, and to allow the thermometer to remain in position for five minutes.

In comparing the mouth and rectal temperatures, one of the first things noticed was that when the mouth temperature rose, the rectal temperature did the same; when the mouth temperature fell, the rectal temperature fell. However, the degree of change was not always the same. If a rectal temperature rose 1 degree, the mouth temperature might rise .8 of a degree or some other amount. As a rule, however, there was fair degree of sameness in the changes of both mouth and rectal temperatures, and, with these variations in mind, it might be said that the two temperatures kept in step.

When I commenced to ascertain which method of taking temperatures was most reliable, little did I dream of the magnitude of the work. It was necessary for me to call in my colleagues and between us we learned some alarming truths.

After examining one hundred patients over a period of three months, temperatures being taken three times a day under our usual schedule, mouth and rectal temperatures being taken synchronously, care being taken that all conditions were equal, and trusting to the patients' honesty, the nurses' ability and the accuracy of the thermometer, we had the following results after examining eighty of the charts of adult patients with a total of 22,280 temperature readings.

Combining the morning, noon and evening temperatures, we had these registrations:

1,173 where both the rectal and mouth temperatures registered the same.

| | | | |
|---|---|---|---|
| 2,498 | with | .2° | variation. |
| 4,739 | " | .4° | " |
| 3,825 | " | .6° | " |
| 3,128 | " | .8° | " |
| 2,667 | " | 1 ° | " |
| 872 | " | 1.2° | " |
| 324 | " | 1.4° | " |
| 177 | " | 1.6° | " |
| 63 | " | 1.8° | " |

22 " 2 ° "
10 " 2.2° "
3 " 2.4° "
2 " 2.6° "
3 " 2.8° "
1 " 3 ° "

There were also a number of readings where the mouth temperature was higher than the rectal.

These comparative temperature readings were taken only for the purpose of ascertaining the reliability of the methods in vogue and upon which method the greatest reliance could be placed.

From the great number of mouth and rectal temperatures registering the same and from the great degree in variation in some of the registrations, we felt that there was a discrepancy somewhere. So we took corresponding readings of 20 children over a period of four weeks under the following conditions:

1. Temperatures taken at 8 and 10 A. M., and 1, 3, 5 and 7 P. M.
2. The mouth and rectal temperatures were taken synchronously.
3. The thermometers were left in position five minutes.
4. If both thermometers registered the same, both thermometers were shaken down and replaced and left in position fifteen minutes instead of five minutes.
5. If rectal temperature was lower than mouth, the rectal thermometer was shaken down and replaced and left in position fifteen minutes.
6. If mouth temperature dropped instead of rising with rectal temperature and if the cause could not be learned, the thermometer was shaken down and replaced and left in position fifteen minutes instead of five minutes.
7. All were selected cases and care was taken that there were no local manifestations to interfere with the readings.
8. No patient was allowed to cough, sneeze or laugh during the taking. If it so happened, the patient was allowed to rest and the readings were retaken.
9. All patients were at absolute rest in bed while the temperature was being taken.
10. Thermometers were tested weekly against a standard.
11. The temperatures were taken by usual mouth and rectal method for two weeks. The thermometers were then reversed. The mouth temperature was taken with a rectal thermometer and the rectal temperatures were taken with a mouth thermometer for a period of two weeks. Then the thermometers were reversed back and forth on alternate days in order to make doubly sure that there was no error.
12. All patients used individual thermometers, which were numbered.
13. A reliable graduate nurse did police duty at the bedside to see that all conditions were met, with the following results:

RESULTS

| Hours ..... | 8 | 10 | 1 | 3 | 5 | 7 | |
|---|---|---|---|---|---|---|---|
| Same .....25 | 16 | 23 | 15 | 16 | 18 | 113 | |
| 0.2 .....61 | 34 | 61 | 62 | 52 | 40 | 330 | |
| 0.4 .....72 | 65 | 71 | 89 | 67 | 63 | 427 | |
| 0.6 .....63 | 76 | 47 | 65 | 72 | 57 | 380 | |
| 0.8 .....55 | 48 | 58 | 65 | 64 | 81 | 371 | |
| 1.0 .....53 | 72 | 63 | 54 | 57 | 61 | 360 | |
| 1.2 .....37 | 53 | 51 | 43 | 40 | 39 | 260 | |
| 1.4 .....35 | 41 | 33 | 24 | 29 | 31 | 193 | |
| 1.6 .....29 | 24 | 18 | 18 | 24 | 21 | 134 | |
| 1.8 .....16 | 10 | 10 | 16 | 11 | 11 | 74 | |
| 2.0 ..... 9 | 19 | 6 | 15 | 9 | 10 | 68 | |
| 2.2 ..... 4 | 6 | 8 | 6 | 8 | 12 | 44 | |
| 2.4 ..... | 1 | 2 | 2 | 4 | 6 | 15 | |
| 2.6 ..... | 2 | | | | 2 | 4 | |
| 2.8 ..... | 1 | | | | 2 | 3 | |
| 3.0 ..... | 1 | | | | 1 | 2 | |
| 3.2 ..... | | | | | 2 | 2 | |
| 3.4 ..... | | | | | | | |
| 3.6 ..... | 1 | | | | | 1 | |
| ..... 5 | 4 | 6 | 4 | 5 | 4 | 28 | |

The above table shows the results obtained as the following:

113 readings showed there were not any variations between the mouth and rectal temperatures.

330 showed .2° variation.
427 " .4° "
380 " .6° "
371 " .8° "
360 ". 1 ° "

| | | | |
|---|---|---|---|
| 260 | " | 1.2° | " |
| 193 | " | 1.4° | " |
| 134 | " | 1.6° | " |
| 74 | " | 1.8° | " |
| 68 | " | 2 ° | " |
| 44 | " | 2.2° | " |
| 15 | " | 2.4° | " |
| 4 | " | 2.6° | " |
| 3 | " | 2.8° | " |
| 2 | " | 3 ° | " |
| 2 | " | 3.2° | " |
| 1 | " | 3.6° | " |

During the course of these observations there were twenty-eight occasions where the rectal temperature was lower than the mouth temperature, the range of variations being from .2 to 1 degree, but we consider this a negligible factor.

### CONCLUSIONS

While our observations were for the purpose of showing the degree of variation between mouth and rectal readings, we could not help but notice that the accepted standard of 1 degree between rectal and mouth temperature did not hold true, because in our series we found that 0.4° was the most prominent variation in both children and adults.

While this was the most frequent variation, it was by no means constant. It might be almost as great an error to assume 0.4° variation in every case as it would be to assume 1° variation. In the former case, you would be right in about 5 per cent of the cases, and in the latter 1 per cent.

While the degree of change between readings was not the same between rectal and mouth, they tended to rise and fall at the same time.

From the standpoint of the sources of error we concluded that rectal readings were more reliable because, from the standpoint of the thermometer itself, we found the rectal or mouth thermometers are equally reliable in obtaining readings.

With the thermometer in mouth, the patients do not keep the lips compressed firmly on the thermometer for a period of five minutes, and five minutes in a great many cases is insufficient time. The acts of coughing and sneezing and laughing are a detrimental factor in mouth temperature. The element of co-operation of patients is not constant. These conditions are eliminated by rectal readings.

The rectal range of temperature is more constant and the variations are not so marked.

## THE MANAGEMENT OF ACUTE BRAIN INJURIES*

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Though there has been a great advance in the treatment of acute cerebral injuries, there still seems to be some confusion as to the proper course to pursue. There are, and have been from the earliest times, two schools with their adherents, the one advocating a policy of "hands off" and "watchful waiting," the other insisting on active interference in practically all cases, with the result that there has been an exceedingly high mortality. The advocates of either line of treatment are both right, for there are undoubtedly cases that should always be operated on, but when either school insists upon their treatment to the exclusion of the other there is bound to be a high mortality. The result has been an attitude of pessimism on the part of the profession in general and they have acknowledged their helplessness when anything affecting the "master tissue of the body" was present. This feeling may well be expressed by the quotation from Pearce Bailey, "If the patient recovers, remarkable, he had a fracture of the skull; if he dies, well, he had a fracture of the skull." Statistics collected by Besley and Sharpe were discouraging. The former, analyzing 1,000 consecutive cases of fracture of the base of the skull at Cook County Hospital, found that there was a mortality of fifty-three per cent; whereas, Sharpe, in studying the cases of brain injury in three large New York hospitals from 1900 to 1910, found that the mortality varied from forty-eight to sixty-eight per cent. The recent war and the observations of various men, especially those of Cushing and his associates, directed our attention to the subject again. Renewed interest became apparent and it brought out the fact that many cases hitherto considered hopeless were amenable to surgical treatment, but this treatment must be well timed—not haphazard. A careful review of the experimental work done by numerous men shows that the profession has not applied the lessons learned to their clinical cases when confronted with the problem of treatment. Sharpe, who has made a long study of the problem, has written extensively on the selection of cases for treatment and the

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proper time for interference, while recently Jackson has presented his experiences and has attempted to lay down certain rules in treatment based on the pathology present. The combined work of these men reveals the fact that treatment must be based on the correct interpretation of symptoms with a knowledge of the underlying pathology; in other words, every case must be a law unto itself. The symptoms encountered in any case are due to a derangement of intracranial pressure; whether the injury be mild or severe; whether one is dealing with a penetrating or perforating wound, a depressed fracture or a fracture of the base of the skull.

In the following paper an attempt has been made to review some of the literature from an experimental view. This has been supplemented by a report of a small series of cases that the writer has observed and treated during the past three years with the idea of arriving at some definite conclusions with reference to the prevention of the so-called traumatic neurosis.

When a patient is brought in with an acute brain injury, the surgeon is confronted with two questions: What and where is the lesion? And what is the proper mode of treatment? These questions can be answered by having a thorough knowledge of the pathology. The picture presented may vary all the way from a slight restlessness with headache to unconsciousness with a slow hard pulse, deep regular respiration and subnormal temperature—to one of unconsciousness with either a small running pulse of low tension and a cold clammy skin, or with a small running pulse of low tension, a high temperature and a shallow rapid respiration. All these stages are different pictures of a changing pathology found in the cranial cavity. Inasmuch as the brain is easily compressible and lying within a rigid cavity, the various phenomena which take place are pressure phenomena. This pressure is dependent upon the adequacy of the cerebral circulation of both the blood and cerebro-spinal fluid. The degree of pressure accounts for the type of symptom complex presented. The text books have an elaborate classification of concussion, contusion and laceration, but to the writer's mind the more logical would be shock and compression—compensated or uncompensated—associated with laceration, contusion and fracture. We have been too prone to focus our attention on fractures, but, with the exception of depressed fractures, they are incidental; it is not the fracture that we are interested in primarily, but the condition of the soft structures underneath. This derangement in the brain tissue is what produces the symptoms, which vary with the degree of injury as well as with the location of that injury.

The earliest experimental work was done on the human subject by Boerhave in 1712. At that time there was a beggar in the streets of Paris who had lost a portion of his skull, leaving his brain protected only by the dura mater. For a few centimes he permitted Boerhave to note the effects of pressure. Boerhave found that by gentle pressure with his finger, the beggar seemed to see a thousand stars before his eyes; and upon pressing still more forcibly, his eyes lost all their sight; and by pressing still more strongly on the dura mater, he fell in a deep sleep, which was attended with all the symptoms of a slight apoplexy. When the pressure of the hand was removed he gradually recovered from the symptoms as they were brought on, the apoplectic symptoms first vanishing, then the lethargy and lastly the blindness, so that all his senses recovered their former perfection. This actual experiment on the human being is of interest as it is analogous to what happens in animals on experimental pressures. In the 18th century, von Heller began studying cerebral compression in dogs. He found that with moderate pressures the dogs evinced pain, but on strong pressures they fell asleep and snored. Later, in 1837, Sir Astley Cooper, who was working on dogs through a trephine opening, caused, first, pain and irritative symptoms; second, slowing of the pulse and coma. In the same year, Magendie demonstrated the existence of cerebro-spinal fluid, and while working on a child with spina bifida he found by compressing the sac that the fontanelles bulged and that somnolence took place. From that time on numerous workers were engaged in the same work, some of whom did their work by local compression—that is, by working through a trephine opening and increasing pressures locally—while others did theirs by general compression by injecting fluids into the subarachnoid space so that the fluid was disseminated over the whole brain, thus producing a generalized increase of pressure. Von Leyden was an advocate of the generalized method of experimentation, while Hill, Horsley, Spencer, Donders and Cushing all used the local method. All the work seems to indi-

cate that there is practically no difference whether the one method or the other be used; this is shown by the classical work done by von Leyden and by Cushing—each working by different methods and the work of one confirming that of the other. Von Leyden had found that a pressure of 50 mm. of mercury produced pain and restlessness which he ascribes to irritation of the dura, while unconsciousness appeared at 130 mm. Slowing of pulse was sometimes noted at 50 mm.; was constant at 75 mm. and this slowness continued up to 150 mm., while above this it became smaller and more irregular the higher the pressure. The pupils dilated only on high pressures. Von Schulten proved that, as the compressing force increased, the blood-pressure increased. This he ascribed to the action of the pressure on the vasomotor centre in the medulla; this phenomenon keeping on until exhaustion of the centre takes place, when the blood-pressure drops and death results. This he termed the life and death struggle. Cushing, working in Kocker's laboratory, worked through a trephine opening into which a window had been inserted so that he could observe the effects of various pressures on the cerebral circulation and correlate them with other symptoms. He found that as the pressure increased, there took place a difference in the appearance of the arteries and the veins—with some widening of the veins. When this pressure is still further increased the capillaries grow pale, the brain loses its reddish color and the veins running across the convolutions collapse, while those in the sulci remain dilated. This results in a capillary anemia of the brain tissue, and when this affects the medullary centres they are stimulated in such a way that the pulse becomes slower, respiration deeper and fuller, while the blood-pressure goes up. This process of increasing the intracranial pressure with subsequent rise of the blood-pressure can be carried out indefinitely until the medullary centres become exhausted. This was what von Schulten had called the life and death struggle between the compressing force and the vasomotor centre.

In the human subject, what are the underlying causes of the rise in intracranial pressure after injury? The brain reacts to trauma in the same way as the other tissues where the blood vessels have been torn. If the injury is mild, only a small amount of serum is poured out, separating the cells and causing a localized edema; if it is severe, there is a tearing of the capillaries and smaller vessels with subsequent hemorrhage into the pia and arachnoid spaces; while in real severe cases there is laceration of the brain tissue with hemorrhages into the brain substance. Apfelback, in studying "Bruises of the Brain," says that, aside from the lacerations occurring at the time of injury, most bruises come as a result of the tearing of and the bleeding from the pial arteries between the gray and white material. The blood, if excessive, dissects its way out through the friable gray substance toward the periphery. In any injury, from the mildest to the most severe, there is therefore a disturbance of the circulation in such a way that the delicate strands of tissue surrounding the pacchionian bodies and supracortical veins are destroyed; the cerebrospinal fluid is not absorbed; and, as the choroid plexus continues to secrete, the normal flow of fluid across the cortex is interfered with, and it accumulates at the base of the brain in the cisterns. A vicious circle is then set up, for the arteries keep carrying blood in, and the exuded blood mixing with the increasing cerebrospinal fluid adds insult to insult. Intracranial pressure increases; the tissue becomes water-logged; cerebral edema takes place; and a condition is produced which simulates the picture seen in the experimental animal—cerebral and medullary irritability followed by compression and collapse.

Translated into clinical observations, then, we have the changes that manifest themselves as symptoms which are due to pressure changes in two portions of the brain—the one cerebral, the other medullary. They are first irritative or stimulating and then depressing. Mild changes show themselves in the cerebrum only as sensory, motor or memory phenomena; that is, the patient complains of headache; he is restless, irritable and irrational, and if the injury is over the motor area there will be paralysis, but with no particular disturbance of pulse, respiration or temperature indicative of medullary change. In greater pressures, the cerebral centres are put out of commission, for consciousness is lost and the medulla is affected. At first the pressure is stimulating, for the pulse becomes slow, the blood-pressure rises and the respiration deepens, all pointing to stimulation of the vagus, vasomotor and respirator centres respectively. If the pressure increases from further accumulation of extravasated blood and fluid, the pressure become depressant, for the centres in the medulla collapse; the pulse becomes rapid, small, irregular; the blood-pressure

drops; the respiration becomes shallow and rapid while the temperature climbs high as death supervenes, for the life and death struggle in the medulla has been enacted. This is the regular order of procedure, termed the stages of compression and collapse.

To the picture presented above must be added the one that is seen soon after an injury. The pulse is rapid, respiration shallow, blood-pressure low and the temperature subnormal, with a cold clammy skin usually associated with unconsciousness. This is due to the sudden overwhelming stimulation of the medullary centres and is shock. If the injury is located in the occiput or on the base in the posterior cerebral fossa, the patient may not go through the regular steps pointing to compression, but go directly over into the stage of collapse with early death.

If now a patient comes in with an injury to the brain, what is the correct treatment? Shall it be expectant or shall it be one of interference, and if so, what type? These questions can be answered by keeping in mind the results of the animal experiments and by observing the various symptoms that point to what is going on in the cranial cavity. The surgeon must also consider that the purpose of the treatment he institutes must be two-fold: (1) to save life, (2) to prevent that train of symptoms occurring in the patient which are termed the traumatic neurosis and which are manifested by headaches, dizziness, nervousness, convulsions, etc., conditions that will produce an individual who leads a vegetative existence rather than one who can be a wage earner. The one form aims to protect the medullary centres while the other is concerned over the cerebral centres. A careful examination, together with a lumbar puncture, will reveal this, for it will show the degree of pressure and the probable location of the lesion.

Patients who show only cerebral symptoms without unconsciousness, but who are restless, irritable and semi-stuporous, complaining of headache, belong to the class of expectant treatment. If, however, the spinal fluid is bloody and under higher pressure than the normal seven to nine mm., then puncture should be repeated until the decrease of symptoms takes place; but if symptoms increase and the spinal pressure steadily mounts, then operation should be resorted to. In all cases where the patient is unconscious and presents either the picture of shock or collapse, it is the policy of wisdom to defer any radical treatment. In both of these stages any manipulation will hasten exitus rather than delay it and at the same time bring operative treatment of brain injuries into disrepute. To give the individual the best possible chance, the one in shock should be given shock treatment by lowering the head, applying external heat and giving warm coffee enemata. When the stage of shock has passed and the stage of compression commences with its slow pulse, rising blood-pressure and slow deep respiration, then lumbar puncture should be done to ascertain the degree of pressure, and, if necessary, perform operation.

Patients in whom no depressed fractures are found, and who show the characteristic symptomatology of compression, should be decompressed. If symptoms point to a definite locality, such as over the motor cortex, resulting in paralysis, the opening should be over that point to evacuate any blood clot present but if there are no localizing symptoms a subtemporal decompression is the operation of choice with opening of the dura widely by a cross incision. In increasing pressures the dura is tense, sometimes bluish in color, and has lost its pulsation because of cerebrospinal fluid and blood which has filled up the subarachnoid space. On making the opening the fluid spurts out five to twelve inches and the cortex begins to pulsate. Usually the brain looks water-soaked and presses into the decompression opening; therefore, the opening should be at least one and one-half to two inches in diameter or otherwise the operation defeats itself. A rubber drain is inserted and the muscles sutured over the defect. This allows a continuous drainage of spinal fluid into the soft tissues until nature can readjust herself and care for it normally.

In patients with depressed fractures accompanied by incised or lacerated wounds, the obvious treatment is exploration. This exploration should be not only the purpose of wound excision but also to lift up or remove any bone fragments or foreign material driven into the brain substance through the dura. However, one should not wait until urgent symptoms appear since these may be late in coming, as the writer noticed in cases seen in the world war. The earlier this is carried out, the better, for it prevents infection and pressure on the underlying brain substance. The mode of procedure should follow the technique described by Cushing so well.

Of late there has been a tendency to treat many of the brain injuries by lumbar puncture alone. Jackson is a strong advocate of this method and he presents a large series of cases that is very convincing. He resorts to operation only when absolutely necessary. In over 1,000 punctures, he has had no untoward effects. That lumbar puncture is not without danger is shown by a case reported by Archibald.

During the past four years the writer has observed the following cases. Two of them were reported previously. These have been carefully gone over with the idea of trying to gain some knowledge as to the question of the post-operative neurosis.

Case 1.—E. V., aged two and one-half, was seen on July 20, 1919, eight hours after injury. This was due to the kick of a horse over the right parietal region which was followed by immediate unconsciousness. At the time of examination patient was unconscious and there was a contused, bleeding wound, 1.5 cm. long, in the right parietal region through which a small amount of brain tissue was escaping. The pupils were dilated and there was a marked weakening of the reflexes of the right arm and leg. Pulse 106, resp. 20.

Operation: Tripod incision. Excision of wound edges revealing a compound comminuted fracture over the right temporal and parietal region—with a linear fracture passing up onto the vertex and down toward the base in the region of the posterior fossa. The depressed bone was removed, leaving a defect 3x4 cm. The dura was lacerated and there was profuse arterial and capillary hemorrhage. Hemorrhage controlled; cortex cleansed and a rubber tissue drain inserted at lower angle. Skin closed with silkworm gut.

Subsequent course: Patient in shock but rallied. A cerebral hernia took place, but receded under the use of pure formalin painted over it. Wound completely healed on October 31, 1919.

Present condition: Letter from father: Patient well developed and apparently has no ill effects from his injury.

Case 2.—T. T., aged 26, grain buyer by occupation, slipped and fell, striking head on rail. Unconscious immediately; seen twenty hours later, on July 30, 1919.

Examination: Patient in coma. Over left parietal region is an area of edema and ecchymosis. Pulse 52, temp. 99, resp. 22. No evidence of any paralysis. Lumbar puncture shows fluid slightly blood tinged and under moderate pressure.

Operation: Subtemporal decompression left side. Bloody spinal fluid under pressure escaped on incising of dura. Closure of wound in layers. Rubber tissue drain in lower angle.

Course: Stormy convalescence but patient recovered, being sent home August 21, 1922.

Present condition: Unable to do any work for one year. Now working in elevator as grain buyer. Terrific headaches at times. Has periods of nervousness and despondency.

Case 3.—M. M., aged 15, seen on June 2, 1920, in consultation with Dr. G. S. Wattam. While riding horseback she was thrown onto her head and was picked up unconscious. This happened two days previously. On examination she was found to be irrational and very restless, throwing herself across the bed complaining of headache. There was no disturbance of reflexes but her pulse was 56, temp. 97.6, B. P. 116-74. The *x*-ray showed a fracture in the right occipital region.

Treatment: Lumbar puncture with clear fluid under considerable pressure, 40 c.c. removed. Headache and restlessness disappeared.

Course: Patient discharged June 18, 1920.

Present condition: No complaints, no headaches or dizziness. Can work as well as ever.

Case 4.—J. F., age twelve, was seen on August 21, 1920; ten hours previously he had been struck by the handlebars of a bicycle. He was unconscious for two hours, vomited three times and gradually regained consciousness to be followed by a period of semi-consciousness and stupor.

On examination there was a bloody discharge from the nose. He was semi-stuporous, moaning and throwing himself around in bed. There was no disturbance of reflexes. Over the left frontal region just above the eye there was a small, incised, lacerated wound. The tissues around the left eye were discolored and edematous so that the lids could not be opened. Pulse 63, temp. 97, B. P. 112-80.

*X*-ray examination showed a depressed fracture under the area of injury. Lumbar puncture did not reveal any increase of tension but the fluid was apparently pure blood; 10 c.c. were taken off. Since there was evidence of a depressed fracture, and even though the fluid was not under pressure, operation was advised since the stuporous condition continued.

Operation: Wound excision revealing a depressed fracture of frontal bone above orbit with extension into the orbit. By means of a drill an opening was made so that the depressed bone could be removed, leaving an opening 1.5 inches in diameter exposing the dura. It was tense, there was no pulsation and the color was blue. A cross incision was made in the dura and bloody fluid spurted out a distance of 6 or 8 inches. As soon as this happened the cortex was seen somewhat wet, but pulsating normally. Rubber tissue drain inserted—wound closed in layers.

Course: Drainage profuse for twenty-four hours, stupor cleared up and he was discharged apparently well on September 10, 1920.

Present condition: No complaints. Works like any of the other boys.

Case 5.—Earl B., aged 25, seen August 30, 1920, six hours after injury. Six hours previously while threshing he was kicked in the forehead by a horse. He was not rendered unconscious but bled freely. He was given first aid by Dr. A. S. Hoiland and sent to the hospital.

On examination he was semi-stuporous but could be aroused. There was a long transverse wound in the forehead above both eyes. The entire upper portion of the face and forehead had apparently been pushed one and one-half inches inward. Hemorrhage was profuse and an opening was seen extending into both frontal sinuses. The pupils were dilated and there was no reaction to light or accommo-

dation. He could see indistinctly. Pulse varied from 43 to 48, B. P. 140-70.

Operation: Wound excision showing an extensive fracture of the frontal bone and the nasal bones pressing back into the floor of the anterior fossa. Both frontal sinuses rongeured out exposing the dura over both frontal lobes. By an elevator the nasal bones and the nose were lifted back into place. Hemorrhage, profuse, from the anterior end of the longitudinal sinus was controlled by packing. Dura was not opened because of the communication into the nose. Wound closed in layers with drain inserted.

Course: Uneventful. Drain removed in forty-eight hours. Discharged well on September 23, 1920, but showed that there was a permanent dilatation of right pupil with inability to look outward because of paralysis of external rectus.

Letter, May, 1923: Whenever he has a cold it seems to settle in his old wound and it swells up. This is accompanied by headaches. When this occurs he gets dizzy and must go to bed. He then becomes nervous. He is able to work. What evidently takes place is an ascending infection from his nose with pressure over the frontal lobes, this continuing until the cold disappears and drainage takes place through the nose.

Case 6.—Mrs. H. O., aged 48, seen on July 1, 1921. Four hours previously an automobile in which she was riding had been struck by a train. She was brought in unconscious with Cheyne Stokes respiration. Right pupil dilated, left contracted. Pulse 96, B. P. 110-70. There was a contused area with edema over the left temporal region.

Operation: Subtemporal decompression left side. Brain tissue badly lacerated.

Course: Death in six hours.

Case 7.—J. O., age six, injured twenty hours previously by being thrown against the cement curb by an automobile. He was seen in consultation by my associate Dr. T. Bratrud ten hours after his accident, and by myself twenty hours after the accident. Dr. Beiderman, the attending physician, says that he had vomited blood twice.

Examination showed that he was very restless and resistant. There was no disturbance of reflexes. Marked ecchymosis of tissues around both eyes. Over the left parietal region there is a contused area and there is a continual drainage of spinal fluid from the left ear. Pulse 130, temp. 101.

Inasmuch as there was apparently a decompression through the ear nothing active was done, but spinal puncture was recommended if stupor increased.

Course: Patient gradually cleared up. At present he is to all appearances normal and in good health.

Case 8.—J. N., aged 50, injured two days previously by falling down from a church steeple, striking on the left side of the head. He was unconscious, very resistant and could not be aroused.

Examination showed reflexes increased on the left side, diminished on the right. There was a contused wound over left temporal region. Pulse 98, temp. 100, resp. 20.

Spinal puncture revealed a blood tinged fluid not under pressure, five c.c. withdrawn.

Treatment: Spinal puncture following day under slightly more pressure, forty c.c. withdrawn, still bloody. Following day more comatose, and because of request of relatives for operation decompression was done although the favorable time had passed. No increase of intracranial pressure, marked destruction of brain tissue.

Course: Death, six hours post-operative.

Case 9.—D. K., two years of age, first seen September 2, 1922, six hours after injury. While playing he fell on a plow shoe which penetrated the skull and passed about two inches into the brain. There was a profuse hemorrhage followed by a somnolence.

Examination: Patient is sleepy but can be aroused. There is a lacerated, incised wound one inch long over right parietal region through which bone fragments can be felt with a probe.

Operation: Wound excision, rongeuring away of bone fragments. Three pieces of bone removed from within the cortex where they had been driven in. Brain tissue lacerated to a depth of one inch. Debris removed through catheter suction. Rubber tissue drain closure of wound in layers.

Course: Abscess, cortical, developed which discharged through the wound. During the time of development there was continual twitching of muscles of the left side of the face and of the neck and arm. Discharged September 22, 1922.

Present condition: Father says he is as well as ever.

Case 10.—L. G., aged 40, seen June 11, 1922, under the care of Dr. G. S. Wattam, five hours after injury. During the afternoon he was struck on the head by a wire puller. He was unconscious for one and one-half hours, and when seen by Dr. Wattam he was stuporous and bleeding freely from wound on left side, complaining of headache. Pulse 84, temp. 99.

Examination: Drowsy, makes several attempts at vomiting. Pupils equal, react well. One and one-half hours later, pulse 120, B. P. 120-84. Knee jerks more marked on right than left. Profuse discharge of blood and spinal fluid from left ear.

Operation: Wound excision, subtemporal decompression. Dura tense and bulging. Incision of dura liberated a blood clot after which the spinal fluid spurted out eight or ten inches. A lacerated vein on the cortex from which the bleeding had occurred was ligated. Rubber tissue drain, closure in layers.

Course: Free drainage from wound. Patient brighter for three days when headaches recurred. Lumbar puncture showed cloudy spinal fluid under pressure. Lumbar puncture done daily for five days, after which he got along nicely. At present he is nervous and emotional. He has had two convulsions. Headaches are severe at times. He can work, but not as he did before.

Case 11.—C. P., aged 62, kicked by a horse. He was conscious but there was a marked edema over the left side of head. He became restless, complaining of pain in the head followed by a period of stupor.

Examination: Edema over left temporal region with sensation of fluctuation. No evidence of any paralysis. Patient can be aroused. Temp. 93.4, pulse 50, B. P. 120-80.

Operation: Subtemporal decompression left side with moderate degree of pressure present. Dura tense, bluish in color. Subdural clot released. Cortex lacerated. Rubber tissue drain, closure in layers.

Course: Very restless and unruly. Lumbar puncture done eight times. Fluid bloody, under moderate pressure, amounts from three to forty c.c. withdrawn.

Present condition: Feels almost normal, but has not done hard work. No severe headaches, some nervousness and dizziness.

CASE 12.—H. R., aged 26, ex-service man, seen November 2, 1922, one-half hour after injury. Shot himself in right temporal region, conscious. Severe bleeding from wound, vomited freely.

Examination: Skin cold and clammy; no paralysis; edema and protrusion of right eye-ball with loss of sight. Pulse 75. Because of shock being present patient was treated expectantly for six hours, after which a period of somnolence supervened from which the patient could not be aroused. *X*-ray revealed the bullet in the left parietal region about an inch in the cortex.

Operation: Wound excision; rongeuring away the bone; evacuating blood clot and debris. Blood clot in the right orbit evacuated. Bullet track cleansed with normal saline through catheter.

Course: Patient recovered from operation very well. Profuse drainage from wound. On tenth day patient began showing evidence of beginning brain abscess and steps were taken to remove the bullet.

Second Operation: November 14, 1922. Localization of bullet by fluoroscopy. Flap turned over left temporo-parietal region. Old blood clot, partially absorbed, found over the cortex after dura was opened, blood pigment deposited all along the cerebral vessels. Bullet located one inch below surface removed with some destruction of tissue. Rubber tissue drain to cortex and closure in layers.

Course: Patient recovered from operation but was left with an aphasia. Committed to State Hospital December 18, 1922. Present condition unknown.

## COMMENT

In reviewing this series of cases it is noted that no one method of treatment has been followed. The aim has been to treat every case by itself according to the indications present. After careful study it is felt that cases 6 and 8 should not have been operated on. Case 6 had other injuries besides her head injury, evidently being in shock and medullary collapse, so that operation hastened exitus rather than delayed it. Case 8 was seen in a farmhouse a long distance from the hospital, and was treated at home under difficulties. Operation was justifiable but was carried out when the favorable stage of compression had passed. In case 7 nothing active was done, though lumbar puncture was recommended, if necessary. Here, the fact that the patient was draining fluid from the ear shows that this type of auto decompression is all that is necessary at times to tide the patient over.

In a number of the cases, some men may feel that operation has been undertaken where more conservative treatment may have been sufficient. That is probably true, but the treatment has been carried out with the idea of not only saving life but also of preventing post-operative neurosis. The writer feels that the various types of neurosis are due to not only laceration of tissue, but to a permanent derangement in the circulation of the cerebrospinal fluid where absorption is not as rapid as secretion. This he feels is due to a type of chronic arachnoiditis and organization of connective tissue around the pacchionian bodies as well as around the supracortical veins, and which has a tendency to produce the so-called chronic cerebral edema. Rawlings, in a careful review of late war injuries to the head, has recommended decompression in many of these cases with good results. As will be noted on looking over the case records, the writer also combines decompression with lumbar puncture. This is because of the fact that even though in the experimental animal pressure is transmitted equally in all directions, it is probably not so in the injured patient, since blood clot and debris evidently closes up the intercommunicating foramen leading through the falx or the tentorium, for oftentimes lumbar puncture may not reveal fluid under any increase of pressure while a decompression or lifting of a depressed bone will reveal a high grade of intracranial pressure on incising the dura. When lumbar puncture and operation are combined, the medullary and cortical areas are relieved so that a quicker and more favorable recovery results.

## BIBLIOGRAPHY

Apfelback: Studies in traumatic fractures of the cranial bones: 1. Edema of the brain. Bruises of the brain. Archives of Surg., vol. 4, No. 2.

Archibald: Surgical affections and wounds of the head. Amer. Practice of Surgery, vol. 5.

Bailey: Diseases of the nervous system resulting from accident and injury. 1906.

Besley: A contribution to the subject of skull fracture. Jour. A. M. A., 1916.

Cushing: 1. Studies of a series of wounds involving the brain and its enveloping structures. Brit. Jour. of Surg., vol. 5, No. 20.

2. Some experimental and clinical observations concerning states of increased intracranial tension. Amer. Jour. Med. Sci., September, 1902.

3. The blood pressure reaction of acute cerebral compression. Amer. Jour. Med. Sci., June, 1903.

Jackson: The circulation of cerebrospinal fluid and its importance in acute cranial injury. Jour. A. M. A., vol. 79, No. 17.

Rawlings: Remote effects of gunshot wounds of the head. Brit. Jour. Surgery, vol. 10, No. 37.

Sharp: Diagnosis and treatment of brain injuries. 1920.

# THE GIBSON RUBBER DAM TAMPON IN ACUTE APPENDICITIS*

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A few generations ago acute fulminating cases of appendicitis were frequently considered to be the result of the administration of poisons, and efforts were confined to the giving of antidotes and search for the malefactors. With advancing knowledge such conditions were attributed to inflammation of the bowels and finally in 1886, through the efforts of Reginald Fitz, acute appendicitis was established as a definite clinical entity. During the next thirty years innumerable articles appeared on various phases of this subject and many vital modifications in the treatment have been offered. In this paper we wish to present a method of drainage useful in the most severe cases complicated by abscess formation and peritonitis, as taught to one of us (Dr. Webb) by Dr. C. L. Gibson, Professor of Surgery in Cornell University Medical School.

Drainage in appendicitis is and ever will be a mooted question, but there are certain essential points to be remembered. Drainage of the general peritoneal cavity cannot be maintained more than forty-eight hours. In a very few hours the drain is surrounded by fibrinous adhesions which wall off infected areas not in contact with the drain, which, consequently, acts chiefly as a protective pack. It is therefore essential that the whole septic area be drained. In order to absorb rapidly the drain must be loose and should have exit through as large an orifice as possible. When the drain ceases to discharge it should be loosened or wholly withdrawn and replaced if indicated.

In order to accomplish a maximum amount of drainage in cases with large abscesses it was customary some years ago to pack the involved area with large amounts of gauze. The gauze so packed becomes very adherent to the viscera and the removal often required the administration of an anesthetic. In addition the strands of gauze may become involved among the loops of bowel in such a way as to produce obstruction at the time or upon removal of the gauze. This method of drainage served to produce a maximum drainage of the whole septic area, however, and was otherwise satisfactory.

Cigarette drains are used to accomplish this same result, but owing to the fact that they are of equal calibre throughout their length it requires a very large wound tightly packed in order to properly fill the abscess cavity. In addition it is difficult to replace them when once removed. Owing to the fact that they are tightly rolled in a waterproof covering, capillary action ceases as soon as they are saturated, and when removed from a pus cavity they are invariably followed by a gush of pus giving rise to the term "cigarette corks" rather than drains.

Mikulicz of Vienna, who has drawn special attention to the natural barriers in the abdomen, which tend to limit and also to determine the spread of infectious material, devised a tampon prepared as follows. It consists of a square of gauze to the center of which a stout piece of silk is fastened. This is packed in the cavity with the center at the deepest point, forming, as it were, a capsule into which the necessary gauze wicks are packed, the free end of the silk being conducted outward through the middle of the packing. The gauze wicks are withdrawn in from five to seven days, followed finally by the enveloping pouch of gauze which is turned inside out by means of the silk cord. Although very efficacious this drain has obvious disadvantages.

Gibson modified the Mikulicz tampon in the following manner. A square of rubber dam, twenty by twenty inches in size, is folded two or three times in the form of a cornucopia. The apex, which will eventually be the lowest point of this dam, is snipped off, making a hole the size of the little finger. An inch and a half above this the edges of the cornucopia are cut out, making a perforation about one-half inch in dimaeter, and a second and third row of perforations is made higher up about one inch apart. The tampon is then introduced as follows: After the appendix has been removed and the cavity sponged out, the operator carries the tampon into the cavity, the index finger being placed at its apex. The pads and retractors may still be in place. The edges of the rubber dam are spread out and while the operator still keeps his finger on the apex, the tampon is filled with strips of packing. The cavity is usually overstuffed

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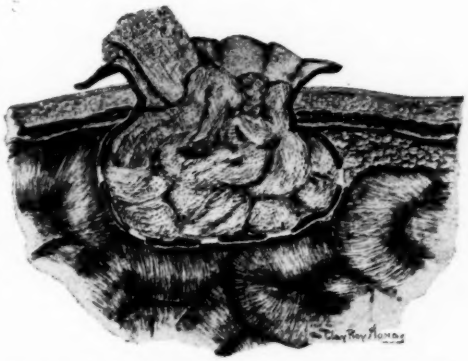
in order to push the gut and omentum well away from the incision in the abdominal wall. As a rule it is not necessary to place any sutures in the wound. A large loose wet dressing is applied. At the end of twenty-four hours the outer dressing is removed, the edges of the rubber dam are loosened around the wound and the gauze packing is partially withdrawn in order to allow better drainage. This process is repeated each day, removing a greater amount of gauze each day and it is all removed by the fourth or fifth day and the tampon is also removed or it is left in place and a small amount of fresh gauze is reintroduced. It is preferable to remove the entire rubber dam at this time and replace it with folded rubber dam drainage, the amount depending on the size of the cavity. At this period one of the principal advantages of using the tampon will have been obtained; namely, the permanent pushing back of the abdominal contents from the wound cavity, and there is now left a well defined, walled off cavity which can be drained with great ease. There is no longer need for wide open drainage and the small rubber dam drains will suffice. As the wound closes, the abdominal walls come together over the abdominal contents, which, inasmuch as they were held back at the outset, will not intrude into the wound as a wedge driving the edges apart.



Schematic drawing of Gibson rubber dam tampon illustrating the packing away from the wound of the intestines and omentum and the free drainage of the layers of the abdominal wall (Gibson Ann. Surg.).

In a review of 818 cases of acute appendicitis operated upon on Dr. Gibson's service at the New York Hospital, C. E. Farr found that 162, or 20 per cent, which were the most serious cases, were closed with the rubber dam tampon. The mortality in the entire series was 4.15 per cent. In those cases in which the rubber dam tampon was used the mortality was 12.3 per cent. When one considers that the entire series is taken from a charity service which draws largely from the many ignorant foreigners which make up a large proportion of the population of the east and west side in New York the mortality of the series treated with the tampon is not to be considered high. Average stay in hospital was 22.4 days. Follow-up records were obtained in 120 cases in which the tampon was used, and hernias occurred in twenty-one, or 17.5 per cent.

In order to illustrate the type of case in which the tampon may be used and to show the progress under this treatment we wish to present the following cases so treated in the past year. We wish to thank Dr. Strachauer for permission to report the two cases operated upon on his service at the University Hospital.

Case 1. Mrs. E., housewife, aged 59, referred by Dr. F. W. Wittich, admitted to St. Mary's Hospital Nov. 13, 1922, acutely ill with abdominal distress. She was a Christian Scientist. She apparently had severe abdominal cramps but had accepted medical attention only at her husband's request and did not co-operate well.

Family history unimportant and past history has no bearing on the present illness.

Present illness began at about 2 A.M. on the preceding day with abdominal cramps followed by vomiting about twelve hours later. Fever was present and she appeared to the relatives to be very ill. She continued to grow worse that night and the next day, and she finally yielded to her husband's request and permitted medical attention about forty hours after onset. Following her illness she stated that she did not recall her trip to the hospital. When taken to the hospital she had not voided for twenty-four hours and a very small amount was obtained on catheterization.

Physical examination. Fairly well developed woman of small stature appearing extremely ill. Mouth, lips and teeth dry and covered with sordes. Tongue is heavily coated. Abdomen slightly distended, respiratory movements present but limited markedly. There is marked tenderness and rigidity in the entire right lower quadrant which shades off at the borders into the other quadrants. Pelvic examination revealed tenderness high up on the right side. Temperature 103, pulse 120, respirations 35. W.b.c. 19,900. Urine normal.

Operation, by Dr. Webb, forty-four hours after onset; gas and ether anesthesia. Lower right rectus incision revealed free turbid fluid on opening the peritoneum. The omentum was present and was apparently attempting to wall off a foul smelling accumulation of pus which was present in the region of the appendix. The intestines were distended and inflamed presenting evidence of a general peritonitis. The appendix was black in its distal two-thirds

and was perforated. It was ligated and removed without inversion of the stump. Split rubber tubes were placed down to the pelvis, a folded rubber dam was placed in the lateral gutter, and a Gibson tampon was inserted. Two through-and-through silkworm gut sutures were placed above and below the tampon to temporarily decrease the size of the wound. A large loose warm saline dressing was placed over the wound.

Post-operative course. The usual post-operative treatment consisting of morphine, forced fluids, Fowler's position, etc., was carried out. Tubes were removed in forty-eight hours. On the fourth day she developed broncho-pneumonia involving the greater portion of the right lung and a part of the left lung. This complication was treated by Dr. Wittich. Oxygen inhalations were necessary in addition to other forms of medication to keep her alive over a period of five days and the lungs were entirely clear on fourteenth day after onset. The abdomen on the third day was soft throughout and there was very little distention. The gauze packing in the tampon was removed partially each day and on the fourth day it was entirely removed and repacked with fresh gauze. On the tenth day all drains were removed and a folded rubber dam drain inserted. On the twenty-first post-operative day all drains were removed and a Carrel tube was laid in the wound superficially for the injection of Dakin's solution and the edges were strapped together. The patient was taken home on a stretcher for Christmas celebration six weeks after onset of her illness. Her wound was nearly healed but she was in an extremely weakened condition due to the combination of acute appendicitis, general peritonitis and broncho-pneumonia. She was up and about, however, at the end of eight weeks. There was a firm wound when last seen.

Case 2. C. L., female, married, aged 28, housewife, admitted to the University Hospital May 19, 1923, at 6:30 P.M. complaining of severe abdominal pain.

Family history unimportant.

Past history. During the previous fourteen months she had had five attacks of abdominal pain similar to the present one, each of which had kept her in bed from four to seven days. She was four and one-half months pregnant on admission. Past history otherwise unimportant.

Present illness, began at 2 P.M. May 17, 1923, with sudden severe cramp-like pains over the abdomen followed by nausea and vomiting. The following morning the pain became localized in the appendix region. She remained at home thinking that this attack would pass away in the manner of the previous attacks. The greatest relief was obtained from lying on the right side with the knees flexed. In the forenoon of the second day she called a physician who diagnosed appendicitis and referred her to the University Hospital.

Physical examination revealed a fairly well nourished woman of rather slight build lying in bed severely ill. There was no distention or retraction of the abdominal walls. The entire abdomen was held tense and the rigidity was board-like throughout. Rectal examination revealed an enlarged uterus but was otherwise negative. Physical findings otherwise negative.

Temperature 99.6 F. Pulse 120. Respirations 24. Blood examination, w.b.c. 13,700, p.m.n. 93 per cent. Urinalysis, normal.

Operation performed by Dr. Webb fifty-four hours after onset (ether anesthesia). Right rectus incision four inches long. There was considerable thin free pus with evidence of a general peritonitis on all visible intestinal walls. The intestines were packed away and the appendix exposed. The pus in the region of the appendix had a foul odor but there was little evidence of walling off. The appendix was gangrenous and perforated. Appendix was ligated at its base and removed. Tubular rubber dam drains were inserted to the pelvis and the lateral gutter and a Gibson rubber dam tampon inserted in the wound. A continuous suture was placed in the peritoneum for a short distance from either end. No other sutures were placed in the wound.

Post-operative course. Patient appeared to have considerable trouble from gas distention but otherwise her condition improved daily. On the fourth day she aborted. Condition was unaffected by the abortion. Temperature reached normal on the eighth post-operative day. The packing in the tampon was removed about one-fourth at a time and was entirely removed and fresh packing replaced on the fifth day. The rubber dam drains were gradually removed and all drains were out on the twelfth day. On the twenty-first post-operative day the wound appeared clean and healthy and was nearly closed. She was discharged cured on the thirty-sixth post-operative day with wound entirely healed.

On discharge the wound appeared to be firm.

Case 3. D. D., male, aged 12, admitted to the University Hospital at 3 P.M. June 26, 1923, complaining of severe abdominal pain.

Family history and past history unimportant.

Present illness began in the morning of June 24, 1923, two and one-half days before admission with general abdominal pains which increased in severity. Nausea and vomiting soon followed and in the afternoon the pains were localized in the right lower quadrant. A cathartic was given that evening. His condition steadily grew worse and at the end of forty-eight hours a physician was called who diagnosed appendicitis and advised operation.

Physical examination revealed a well developed and well nourished boy lying in bed acutely ill. The face was pale and the tongue was dry and coated. Physical examination was otherwise negative with the exception of the abdominal findings. There was generalized rigidity of the abdomen with tenderness over the entire lower abdomen, most marked in the right lower quadrant. The psoas sign was positive. Rectal examination revealed tenderness high up on the right side.

Temperature 100.8 F. Pulse 100. Respirations 20. Blood examination w.b.c. 29,000 with 78 per cent p.m.n. Hb. 82 per cent. Urine normal.

Operation performed by Dr. MacFarlane sixty hours after onset (ether anesthesia). Low right rectus incision. There was about 200 c.c. of foul smelling thin pus aspirated from the abdominal cavity. There was practically no walling off of the inflamed area. The intestines were packed away

from the appendix area. The appendix was acutely inflamed throughout its length and was gangrenous at the tip and ruptured. The appendix was ligated and removed. Tubular rubber dam drains containing a gauze wick were inserted to the pelvis, the right kidney pouch and the lateral gutter. A Gibson rubber dam tampon was inserted and packed with gauze as described above. No sutures placed in the wound.

Post-operative care consisted of Fowler's position, fluids averaging 3,000 c.c. per day by enteroclysis and hypodermoclysis. The pulse and temperature reached normal on the fifteenth day. The packing in the Gibson drain was removed about one-fourth at a time until the fourth day, when it was all removed and replaced by fresh gauze. The purulent discharge was profuse until the eighth day. The drains were decreased in length and size daily. The tubular rubber dam drains were removed on the eleventh post-operative day and the large rubber dam drain was removed on the fifteenth post-operative day and the wound was strapped with adhesive. On the nineteenth day there was very slight discharge and the wound was clean and rapidly granulating. There was no sign of wound infection at any time and there was no sloughing of fascia.

Case 4. L. D., male, aged 13, referred by Drs. Huenekens and Moriarty, admitted to St. Mary's Hospital Aug. 24, 1923, at 4 P.M. complaining of abdominal pain. Family history and past history have no bearing on the present condition. Present illness began at 4 P.M. Aug. 23, when he awakened with general abdominal pain. He became nauseated and vomited at 5 A.M. and several times that morning. He was in Duluth at the time and at 8:30 A.M. left for Minneapolis by automobile. He vomited several times on the way but was otherwise unaffected until 2 P.M. when in order to avoid a collision the automobile was driven down an embankment where it turned over. Immediately following this accident his pain became worse and he was unable to sit up. The trip was completed by train. In the evening he was given a teaspoonful of aromatic cascara. The pain grew worse that night and he vomited frequently and cried with pain. His condition grew worse and the next afternoon he was taken to the pediatrician who diagnosed acute appendicitis.

Physical examination revealed a well developed boy of thirteen years who appeared seriously ill. Findings were normal with the exception of the abdomen. There was no distention or bulging but the respiratory movements were limited. There was marked rigidity of the entire right side most marked in the right lower quadrant and extending across the mid-line to the left side, suggesting a general peritonitis. Rectal examination negative.

Temperature 100 F. Pulse 90 per minute. Respirations 20 per minute. Blood examination w.b.c. 16,000. Urine normal.

Operation, by Dr. Webb, thirty-six hours after onset (ether anesthesia). McBurney incision 3 inches long. Slightly turbid free fluid encountered. There was an abscess containing about 250 c.c. of foul smelling pus located between the cecum and the lateral wall at the brim of the true pelvis with very slight attempt at "walling off." The appendix lay at the bottom of the abscess. It was gangrenous in its middle third and ruptured. The contents of the abscess were evacuated and the base of the appendix ligated and the appendix removed. No inversion of the stump. A tubular rubber dam drain containing a gauze wick was placed in the lateral gutter and another similar drain was placed in the pelvis. A split rubber tube drain was also placed in the pelvis. A Gibson rubber dam tampon was then placed in the wound as described above. Three twenty-four inch strips of gauze packing two inches wide were placed in the Gibson drain, in such a manner that the wound opening was entirely filled. No sutures were placed in the wound. A large warm saline dressing was placed over the wound.

Post-operative treatment. Fifteen hundred c.c. of tap water per rectum before coming out of anesthesia and an average of 3,500 c.c. of fluid per day thereafter. Fowler's position. Temperature ranged as high as 103 and pulse 128. Temperature and pulse rate normal on fifteenth day. Details of wound treatment were as follows: All drains were shortened daily and at the end of sixty hours the split rubber tube to the pelvis was removed and one gauze pack was entirely removed from the Gibson drain. At the end of eighty hours all gauze was removed from the Gibson drain and a smaller amount of gauze was replaced to keep the wound and the rubber pouch within slightly distended. On the sixth day all drains were removed, and the wound irrigated with saline. The cavity beneath the abdominal wall was about the size of a lemon and loops of bowel could be seen forming its walls. The large piece of rubber dam was replaced in the cavity. Each succeeding day the drain was decreased in size, wound irrigated and drain replaced. On the sixteenth day all drains were removed and the wound edges strapped over a catheter which was placed in the wound superficially for the injection of Dakin's solution at four hour intervals. On the nineteenth day the catheter was removed and the edges strapped tightly. He was up in a chair on the twenty-fourth day and on the twenty-eighth day was walking about. At this time the wound when unstrapped was one and one-third inches long, one-half inch deep and the superficial edges were one-fourth inch apart at the widest point. At no time during the wound healing was there any bulging of loops of intestine in the wound or near the edge. The wound was not infected and there was no sloughing of fascia. The wound was entirely closed on September 28, five weeks after operation, with the exception of a small granulating area. He has been in school for the past week.

## CONCLUSIONS

The Gibson rubber dam tampon gives a maximum amount of drainage and is particularly valuable in the deep high retrocecal abscesses where other methods are deficient. It approaches as nearly as possible the wide open method of treatment of infected areas, which is a rational and accepted method in other parts of the body.

Owing to the fact that sutures are unnecessary in completing the operation valuable time is saved.

It is mercifully comfortable.

Properly applied it keeps the intestines and

omentum from the wound opening so that being kept at a distance the "inwards" do not act as a wedge driving the wound apart.

Because of the free drainage of the layers of the wound and the lack of sutures to produce shelves above and below each layer in which pus may gather, wound infection does not take place and there is no necrosis of fascia to delay healing.

One case in five requires subsequent repair on account of hernia but inasmuch as all the abdominal wall structures are preserved the repair is extremely easy.

There is nothing to prevent additional drainage of the pelvis, lateral gutter, etc., in conjunction with the Gibson drain.

We believe that the proper use of this drain will lower the mortality which occurs in neglected cases of appendicitis.

The possible occurrence of hernia is not to be considered.

The "follow-up" records in these cases show almost no post-operative complaints.

BIBLIOGRAPHY

Gibson, C. L.: Personal communication.
Gibson, C. L.: Annals of Surgery,, April, 1916, pp. 443.
Kelly and Hurdon: The Vermiform Appendix.
Gibson, C. L.: Annals of Surgery, 1921, lxxiii, pp. 470.
Farr, C. E.: Annals of Surgery, 1921, lxxiii, pp. 473.
Munro, J. C.: Keen's Surgery, Vol. 3, pp. 716.

## FEEBLE-MINDEDNESS*

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Feeble-mindedness is one of the leading problems which claims the attention of all branches of social science today. With the passing of the old notion that political equality signifies intellectual equality in our democratic society, we have come to realize that many types of social failures are caused by mental incapacity or inability instead of by unwillingness to conform to the current social standards. Our courts and penal and corrective institutions are rapidly adjusting legal and personal responsibility to individual mental capacity.

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The scientific study of the feeble-minded is only about fifteen years old, and the last few of these have witnessed an astonishing increase of popular and scientific interest in this subject. This interest has developed so suddenly and has become so widespread that the increase of knowledge and the establishment of methods, criteria and terminology have not kept pace with the new developments. Consequently there is considerable difference of opinion as to what feeble-mindedness is, and especially as to who may be properly included under this term. Considerable of the confusion now prevailing in the different conceptions of feeble-mindedness is caused by failure to discriminate between superficial manifestations and fundamental basis. This is due to the fact that the condition of mental defect has been defined from four, or more, different points of view, and the definitions thus compounded have been construed to better define the subject from the viewpoint of that particular branch of science.

No matter from which angle we view this subject the fact is still very evident that *feeble-mindedness is a condition of the arrest of mental development.* However, for our convenience we will use the definition of Dr. H. H. Goddard, whereby he defines feeble-mindedness as a "*state of mental defect existing from birth or from an early age, and due to incomplete or abnormal development, in consequence of which the person affected is incapable of performing his duties as a member of society in the position of life to which he is born.*"

### INCIDENCE

The enumeration of the mentally deficient population of any country is an extremely difficult matter, and there can be no doubt that most official inquiries, particularly those by means of the ordinary census, fall very short of telling the truth. The reasons for this are very numerous and obvious.

The investigations of the English Royal Commission in 1904 showed that of the population of England and Wales, one in 248 were feeble-minded. It is probable that we have quite as many in America. For the most part they are living in the families to which they belong. Some of the states have not provided institutions for their care, and in none is there provision for more than a small percentage of the total number. Dr. Fernald says, "There are at least 200,000 pronouncedly feeble-minded persons in the United States. Of these, about 40,000

were being cared for in institutions, on January 1, 1920.

According to Dr. Pearse Bailey, the psychological examination of recruits which was made during the great war shows that the incidence of feeble-mindedness among the drafted men into the army was as high as six per thousand and he considers that even this is probably below the rate of incidence in the population generally.

### CLASSIFICATION

Persons who are recognized as being below the line of normal intelligence have been at different periods called by different names. Originally called idiots, they were later designated as imbeciles, and still later as feeble-minded. But since more study has been put upon the problem it has become necessary to designate different degrees of defect, and by common consent the custom has grown up of applying the term idiot, to the lowest grade, imbecile, to the middle grade, and feeble-minded, to the highest. In England this is the common classification. In America we have used the expression feeble-minded both in a specific and in a generic sense; specifically, to designate the highest division, and generically, the whole group. Our institutions for these defectives are generally known as Institutions for the Feeble-Minded.

Since the introduction of the Binet Measuring Scale of Intelligence and the grading of these children by their mental age, a closer classification has been followed. The American Association for the Study of the Feeble-Minded has adopted the following scheme: The term idiot is used to designate those of mental age up to and including two years; imbecile, those from three to seven years inclusive; for those from seven to twelve years a new term has been coined—they are now called morons. The term moron, therefore, in America designates almost exactly what is meant by "feeble-minded" in England. This classification has been almost universally adopted and is a great step forward in the study of this problem. It answers almost every purpose from the sociological and psychological viewpoint. But owing to the fact that it does not take into consideration any of the physical abnormalities, it does not meet all the requirements of the medical and institutional people. So, from usage, we have about arrived at the point where we are combining this classification with the one that is more descriptive of the physical condition.

It is along this line of the combined classification that I have tried to arrange this little clinic to show you cases illustrating the different types, which we shall discuss briefly as we go over them.

The first group to which I wish to call your attention is the moron. This constitutes the largest and most important division and in this group the sexes are equally divided. The higher members of this group are but little removed from the general populace and would pass muster as normal if our diagnosis rested upon inspection only.

The great majority appear to be practically normal physically; nevertheless, Dr. Lapage found that over 90 per cent showed some of the so-called stigmata of degeneracy and that these defects were usually in combination, while about 24 per cent were triple. (Tredgold.)

We can get an approximate idea of this group if we will recall the normal child of from eight to twelve years of age, to which, of course, we must add the physical growth and especially sex development, which react upon them to produce certain characteristics not found in the normal person of the same mental age.

The typical moron is usually up to the average in ordinary matters of a concrete character. He expresses himself well, but fails in adjusting himself to any complex environment in which logical reasoning is required. He has no thought of the future or of anything beyond the immediate consequences of his acts, yields easily to sex temptations, and is usually improvident and drifts into pauperism. His attention is transitory, his memory poor. As a class they are imitators, are readily amused by anything ridiculous and are easily touched by anything pathetic. They constitute a very fertile field from which we harvest many of our petty criminals, prostitutes and minor offenders.

The boy that I have selected to represent this group is slightly sensitive regarding his condition, so I will not call him in until I have enumerated a few of his defects. Upon inspection he appears normal in every way, yet is a very low-grade moron, hardly qualifying as a moron.

His intelligence quotient is .49. He is twenty-one years old, and small of stature; he walked and talked at fourteen months and dentition occurred at about the same age. When he was three months old he was sick; he had several convulsions (although he is not an epileptic) and this is the at-

tributed cause of his condition. His trouble was not noticed until he started school, where he attracted attention by his inability to learn, although he was finally promoted to the fourth grade.

Physical examination is negative; Wassermann negative. He is left-handed and at times masturbates. He is an awful liar, excitable, restless, obstinate, bossy and very important; a fairly good worker under close supervision. Handicapped by his low mentality, this boy was successful in purchasing a high-priced automobile without having any funds to pay for same.

The next group that we will consider is that of the imbecile, with mental ages from three to seven inclusive. This class is about one-half as numerous as the moron. These children can understand language, especially that pertaining to their daily life. There is also memory of parents and some incidents of home life. They may be active or apathetic and often show a great deal of obstinacy. Sensation, self-preservation, perception, instincts and emotions are present, but fear is frequently not shown.

They can do some industrial work, under supervision, where the procedure is fixed and no judgment required.

In this class physical defects are more marked and we find numerous abnormalities. Occasionally giantism is seen, but as a rule the stature is several inches less than that of a normal person. In addition to that, the body is ill-formed, its balance and carriage are ungainly and stigmata of degeneracy are numerous and prominent. Various degrees of paralysis occur in a certain proportion of cases and probably about 40 per cent of all imbeciles suffer from epilepsy. (Tredgold.)

The expression of the imbecile is usually, in itself, sufficiently striking to attract attention. In this class there is a slight preponderance in the male sex. (959 males—843 females, Tredgold.)

To illustrate this group, we have chosen two boys. The first, E. J. D., was born March 31, 1904, and appeared normal until six and one-half years old, when he was injured by striking his head on the pavement. From that time on his present condition was manifest.

This boy is now past nineteen years old, yet his mental age is 4-6, giving him an I. Q. of .30, which classifies him as a low grade imbecile.

His family and personal histories are negative; Wassermann negative.

Physical examination shows nothing but a good-looking, well-nourished boy, that is inclined to be excitable, restless, and irritable, but easily managed. He does not present any of the usual stigmata of degeneracy and he handles himself much more gracefully than most imbeciles. He is able to do some work under supervision. He is not an epileptic.

This other boy, A. W., is also well developed and well nourished. He has a funnel-shaped breast and a high-arched palate. He is not an epileptic but has a vicious temper. Personal history is negative. Family history shows that his mother was insane and that he has two brothers that are feeble-minded. His condition has been noticeable since birth. This boy was born in 1899, which gives a chronological age of 24 years. His mental age is 4-4, making his I. Q. .29.

### IDIOCY

In this third classification we have the lowest degree of defect, with a mental age of from three years old to zero.

In Great Britain, the idiot is legally defined in the mental deficiency act of 1913 as: "A person so deeply defective in mind from birth or from an early age as to be unable to guard himself against common physical dangers." (Tredgold.)

This class is about one-third as numerous as the imbeciles, and with regard to sex is nearly equal, with the males very slightly predominating. (Tredgold.)

The various anatomical and physiological anomalies reach their maximum in the idiots. Some are grotesque, but the majority are such stunted, misshapen, hideous specimens, that they arouse feelings of repulsion, rather than of levity. Paresis and paralysis, with localized atrophies, are often present. Epilepsy is very frequent and occurs in about 56 per cent of cases. (Tredgold.) Most idiots are sterile but this is not always the case. (Tredgold.) They may be able to walk, and are often active. They are all dirty in their habits and occasionally rumination is seen.

They have no memory, perception or volition, and attention is almost entirely absent. Sensation may be present but is usually absent or very dull; thus we find them impervious to sounds, sights, tastes or odors. They learn nothing from experience. They occasionally learn to vocalize, but never learn to talk. Movement is often abnormal in qual-

ity and quantity and as a class they are universally prone to disease (especially tuberculosis) and to early death.

As an example of this class (idiots), this boy, A. E., is a very good example.

Here we see nothing particularly abnormal in looks, except that blank expression. He has not many of the stigmata of degeneracy, the high-arched palate being the most pronounced.

This boy's mother was insane, and he has two brothers who are idiots. His condition has been noticeable since he was two years old.

He is thirteen years old, yet his mental age is so low he could not be tested, leaving him in the class of absolute idiots. He is not an epileptic.

The cases already shown illustrate the groups in the generally accepted classification, and it is probable that a large percentage of all defectives belong to the primary group. The majority of these, as already mentioned, present no special distinguishing features, beyond the anatomical, physiological and psychological anomalies common to this class in general.

A small proportion, however, present such special characteristics as to form distinct clinical types, and it is in these cases that we must combine the two classifications.

The first group we shall consider will be the microcephalics.

By this term we usually mean a person whose skull is less than 17 inches in its greatest circumference. But I am of the opinion that the criterion should be one of shape, rather than size, and if we use this standard these cases would constitute about 5 to 6 per cent of all defectives.

The cause of this condition has attracted much attention, particularly from anatomists, some claiming it to be due to a premature closure of the cranial sutures, and others that it is due to a synostosis of the cranium. Tredgold thinks it is neither, but is the result of an inherited blight.

The two chief clinical distinguishing features of these cases are the peculiar configuration of the skull and the (usually) very small stature. In consequence of the diminished surface of bone to be covered, the scalp is nearly always extraordinarily thick and redundant and in some cases is permanently thrown into a series of deep furrows, running anteroposteriorly. The hair is usually coarse and wiry.

The second characteristic, that of diminished stature, is not so marked, but many of them are called dwarfs.

The intellectual capacity of these persons varies within considerable limits. The majority are idiots; some belong to the imbecile class. The mental features common to most of them are the absence of any sensory defect, a general vivacity, restlessness and muscular activity, a considerable capacity for imitation, and an inability for sustained effort. They usually have remarkably good hearing and sight, and are extremely quick in powers of observation. In disposition, the majority are affectionate and well-behaved. About one-half of them are subject to epilepsy. Under this heading, we have several remarkable cases to show you.

The first case is that of a girl, M. M., born September 19, 1909, now being thirteen and a half years old. Her mental age is 2-6, making her I. Q. .18, which places her in the idiot class.

This girl's father is a degenerate, and he is also the father of this patient's mother.

Personal history is negative and physical examination reveals a decided cardiac murmur, systolic in time. Her scalp is not fissured. The circumference of her head is 16 inches. She is not an epileptic. Up to the present time she has never menstruated.

The next two cases we will consider together as they are brother and sister. We have no data on the family.

Their personal history is negative, and their Wassermanns are negative. As in all of these cases the condition was present at birth.

The boy, W. B., the older, was born February 9, 1914, making him nine years and four months old. He is not an epileptic.

The girl, A. B., was born February 12, 1916, making her age seven years and two months. They are both idiots with a mental age of much less than three years.

They present no physical abnormalities. Their bodies are well developed. They are very active.

The circumference of the boy's head is 15.25 inches, and the girl's is a great deal smaller, measuring 13.75 inches —the smallest head we have at present, in our institution. She is not an epileptic.

The outstanding point of interest in the next cases lies in the fact that they are twin sisters, the first children born to a very strong and active, but unintelligent father and mother. The father was twenty-five years of age, the mother nineteen, at their birth, which was at full term and an ordinary labor. Each baby weighed 4 pounds; both were artificially fed; their condition was present at birth —small head and features and undersized.

Dentition occurred at about one year; they walked at one and one-half years, and talked at about four years.

They have two brothers and three sisters living and well. None are dead. They are both right handed, very active, but clumsy. They are not epileptics; the Wassermanns of both are negative.

They are now nineteen years nine months old (Sept. 7, 1903), and both are idiots with a mental age of less than three years. Bodies normal but small. The circumference of the older twin's (E. A.) head is 14.25 inches, and that of the second born (M. A.) is 14.5 inches in circumference. E. is a very little brighter than the other. Menstruation is now established in both girls.

In contrast with the cases we have just seen we shall now consider the unfortunate group known as hydrocephalics.

Hydrocephalus is an excessive accumulation of the cerebrospinal fluid, in the ventricles, or in the pia mater or both, characterized by enlargement of the head and more or less pronounced nervous phenomena. Much uncertainty still exists as to the cause, but syphilis and tuberculosis seem to play an important part. The peculiar enlargement of the skull makes diagnosis easy, it being uniformly increased in all directions and tending to assume a globular shape. The greatest circumference is at a level of the temples and varies from a little above normal to about 30 inches. The forehead is high and protruding. The fontanelle is tense and the sutures often widely separated. The scalp is thin and often marked by large and prominent veins. Impairment of sight and hearing is very common. Strabismus is frequent. Epileptic convulsions are usually present in the acute stage, but tend to diminish and often disappear as the case becomes chronic or arrested. Most patients are undersized. As a rule they are quiet, confiding, affectionate, obedient and willing, although paresis or muscular weakness may prevent them from doing what they wish.

We have three very good examples of this condition:

The first is a boy, C. B., born September 25, 1902; full term; ordinary delivery; first born; weighed 11 pounds; was breast fed and was a strong baby.

Father and mother were both thirty-two years old at the time of his birth. Mother died of heart disease at age of forty-six.

Has four brothers living and well and two full term children were born dead.

This boy talked at fourteen months and walked at sixteen. When six years old he had meningitis.

This boy's head is 26 inches in circumference. The fontanelles and sutures are closed.

He is not an epileptic. He is now twenty years and nine months old and his mental age is 6-10, making his I. Q. .45.

This case, a girl, M. E. D., was born June 2, 1917.

Enlargement of the head in this case was not noted until she was two months old, but at the age of one year her head measured 22.5 inches. Dentition took place at nine months. Family history is unknown.

At the present time she is six years old and her mental age is less than three.

Her head now measures 26 inches in circumference and the fontanelles and sutures are open. Her eyeballs are characteristic.

She is a very good example of a hydrocephalic idiot, and is not an epileptic.

Here we have another good example of the same condition, a girl, C. T.

Born May 1, 1915; full term; ordinary labor; was first baby; weighed eight pounds; was breast fed and was a strong baby although her condition was noticeable at birth.

She has one brother well and healthy. Mother died at age of twenty-four years, of influenza. This girl is right handed; reflexes are diminished; she is partly paralyzed on the left side; she has a decided mitral systolic blowing murmur.

She began to talk when two years old. At present she is eight years old and her mental age is two years and ten months.

The circumference of her head is 25.5 inches. The fontanelles and sutures have recently closed, showing that the pressure has subsided and would now be called an arrested case, although the damage is done. She is not an epileptic.

In conjunction with the last two groups, I wish to call your attention to this boy, who is not a microcephalic nor a hydrocephalic, but due to the contour of the skull might easily be mistaken for either, if seen alone. This is the decidedly rare condition known as oxycephaly (steeple head, tower skull) and is probably an after-effect of meningitis, brought about by premature union of the frontal and coronal sutures.

The particular characteristics are the skull and eyes, the skull rising high in the frontal region to a sharp point at the vertex. The palpebral fissures slant downwards and outwards and there is marked exophthalmos. Vision is usually impaired, due to optic atrophy; severe headaches are usually present.

This boy, L. M., was the fourth child in the family; born at full term; ordinary labor; weight, 9 pounds. Bottle fed and suffered from malnutrition. Father aged 34, mother 25, at time of his birth. One brother and two sisters are well and healthy. Mother died of appendicitis.

Walked and talked at two years; is left handed; is very striking example of web fingers and toes. He is now thirteen years and seven months old. His mental age is 5-6, giving I. Q. of .40, an imbecile. Not epileptic.

The next group, namely, the mongolian, is one that should be discussed at length, because of the apparent increase in the number of cases coming under this heading. But time does not permit.

This is one of the most clearly defined and best known groups of defectives, and is so called from a more or less close resemblance to the Asiatic type

of countenance,—the slanting eyes and round face. This group constitutes about 5 per cent of defectives in adults and a still larger proportion in children.

The cause of this condition is still shrouded in obscurity, but recent investigators have suggested that it is due to the abnormal functioning of the glands of internal secretion. It is generally agreed that the condition is due to something that interferes with prenatal development. As a rule there is only one defective in the family where mongolians occur, and they generally come from the better class of people. They are often the last born in large families.

The chief characteristics of this group are the slanting eyes, round face, short stubby fingers, rough skin, poor circulation, a decided lack of occipital protuberance and the large thickened tongue with hypertrophied papillæ and irregular, transverse fissures. The hair is dry, scanty and wiry. Cerebral complications, paralysis and epilepsy are exceedingly rare in this group. As a rule, mongols die early. They are rarely met with above the age of thirty years and the average age at death is about fourteen years. The chief cause of death is tuberculosis.

It is a remarkable fact that the mentality of the mongolians is almost always about that of a child four years old. (Goddard.)

These cases are oftentimes wrongly diagnosed as cretins.

In order to demonstrate the leading characteristics of this group, we have had to select a number of cases, owing to the fact that no one patient has all of the many stigmata that belong to this classification.

This first boy, Wm. J. M., was born at full term; ordinary labor; weighed six pounds; was third child born to parents twenty-eight years old; was breast fed; and as a baby was weak and slept all the time. He has always had some blephoritis.

Head and body were always small; dentition occurred at two years of age. Walked at three; talked at four. He is right handed and has the general faults of most mongolians: restless, noisy, destructive, and filthy.

His memory is very poor. He is not an epileptic. Three brothers are living, all well and healthy. His chronological age is 12-5 and his mental age less than three.

This boy, H. J., was born January 25, 1904, at full term, after a protracted labor (no forceps), and was the fourth and last child born to a father fifty years old and a mother forty-three.

Breast fed and weak from birth, he walked at three years; he is excitable, noisy and is an imitator. He is right handed. Not an epileptic.

Family and personal histories, negative. This boy has the average shaped head, and the rough skin. He is a good example of the fissured tongue.

Nineteen years and four months old, with a mental age of 2-10 and an I. Q. of .19.

This next boy, J. H. N., walked when two and one-half years old.

Family and personal histories are negative. Has one sister well and healthy. This boy's chief characteristic is the rough skin, especially noticeable on his hands.

He is not an epileptic. He was born November 1, 1903, which makes him nineteen and a half years old, and his mental age is less than three years.

This girl, M. L. P., was born February 23, 1909, at full term; ordinary labor; weighed six pounds; was breast fed and has been peculiar since birth, with dwarfed body and small head.

She walked and talked at two and one-half years and dentition occurred at one year. She is the eighth and last child in the family. Father was forty-nine and mother forty-two years old at time of her birth. Her brothers and sisters are all living, well and healthy. Paternal grandmother was peculiar and disappeared. Otherwise family history is negative.

She is left handed. Has never menstruated and is not an epileptic. She has no power of observation and is apathetic. Although she is fourteen and one-fourth years old her mental age is 3-6 and the I. Q. is .25.

The predominating points of interest in this girl are the slanting eyes, the fissured tongue, and the marked distance between the toes.

This next case, E. G., was born March 11, 1909, at full term and with ordinary labor; weighed 8 pounds; and was breast fed. Her condition was noticeable at birth. Her father and mother were both forty-two years old at the time and she was the seventh and last child born.

She has one brother and three sisters living, all normal. Dentition took place at one year. She walked at three; talked at four years. She is obstinate, noisy and destructive, but not epileptic.

Her Wassermann is negative, reflexes exaggerated. She has a rough, coarse voice, and a fissured tongue.

She is 14 years and three months old and has a mental age of 3-4 with an I. Q. of .24.

This other case, a girl, J. S., was born May 28, 1916, at full term; ordinary labor, weighed 5.5 pounds and was the eleventh child, born when the father was forty-seven and the mother forty-three years old. Seven brothers and three sisters living and well.

Family history negative, with one exception. This girl's oldest sister married a first cousin and their first baby is feeble-minded.

As a baby she did not sit up until a year old. Teething took place at one and one-half years, and she walked when two and one-half years old. She has always been destructive, and of a rough and ugly disposition. She will also run away.

She is right handed. Reflexes are diminished. She usually allows her tongue to protrude. She shows a marked

separation of the toes. She is now seven years old and her mental age is less than three.

The next group we will consider are the cretins. It is now established beyond any doubt that cretinism is dependent upon an absence or diminished secretion of the thyroid gland. It is a condition of wide incidence, being found in every quarter of the globe, but most prevalent in Switzerland.

This condition is one that is noticeable in early childhood. They are usually fat and puffy and generally remain dwarfs. The skin is yellow, dry and thickened and wrinkled and has the appearance of being too large for the body.

The head is large and the fontanelles are late in closing. The nose is broad and flat, the lips are thick and swollen and the tongue so large that it often hangs out of the open mouth.

The belly is protuberant and the legs short and crooked, the whole body unwieldy, its balance unsteady, and its gait ungainly. The neck is short and thick and the supraclavicular fossæ contain cushions.

The hair is thin, coarse and dry; the nails are brittle, and the teeth poor. The genitals are poorly developed and puberty is delayed.

Their body temperature is low and they are more or less deaf. They are always apathetic, stupid, and lacking in memory and decision. They are not easily excited, but are sometimes vindictive.

They are usually heavy eaters, but very careless. Death is usually due to some intercurrent disease, but occasionally they live to be fifty years old.

I have several remarkable specimens to show you today.

This first case, M. B., is a very good example of the typical cretin, without any outstanding points of interest.

Here the thyroid is absent. Menstruation occurs irregularly. This girl was born November 10, 1893, making her almost thirty years old. Her mental age is 3-4, giving her an I. Q. of .23. (Dr. Dvorak.) She is not an epileptic.

This girl, C. F., was born December 13, 1897. Her father was Spanish (22 years old) and mother Norwegian (26 years old). Father and three brothers are living and well. Mother died at age of thirty-four of pulmonary tuberculosis. Mother had one first cousin that was feeble-minded.

This baby was the first born; at full term; ordinary labor; weighed 11 pounds. At birth she had six fingers on one hand (the supernumerary has been removed) and her condition has been noticeable since then. She is right handed.

Dentition occurred at age of three. She walked at seven and talked at nine years of age.

She has the dwarfed stature, prominent abdomen with protruding umbilicus, large wrists and ankles and short thick neck, together with the dark, swarthy skin and black, straight hair.

This girl has never menstruated. Her powers of observation, attention and memory are very poor.

Her age is twenty-five and one-half years and her mental age is 4-6, making her I. Q. .30. She is not an epileptic.

This girl, J. J., was born June 18, 1885, the second child born. Father, aged 29, and mother, aged 23. She was born at full term; ordinary labor; was breast-fed. Family history negative (three brothers and two sisters living and well). Her condition began to be noticeable when eight months old.

She has the square head, wiry hair, thick tongue and the usual skin and posture of a cretin.

She menstruates regularly, but at times hemorrhages. This was stopped after a course of thyroids.

The most interesting thing in connection with this case is that she has developed epilepsy and this is a very rare condition in cretinism.

She is thirty-eight years old and her mental age is less than three.

The thing that I wish to call your attention to in this next case, H. L., is the marked deformity of the legs, showing an extreme case of knock-knees.

This girl was born June 27, 1889, at full term, delivery normal, the first born, when father was thirty-two and the mother twenty-two years of age. There were several feeble-minded children in the mother's family.

She has one sister living and healthy. She was breast fed and was very weak as a baby. She walked and talked at six years old.

She is left handed, dwarfed in stature, has the coarse, wiry hair and square head, the typical skin and the supraclavicular pads. She has never menstruated and is not an epileptic.

She is now thirty-four years old and her mental age is less than three.

These next two cases are of more than ordinary interest owing to the fact that they are sisters. The older girl, N. M. D., was born September 15, 1895, when the father was twenty-three and the mother twenty-five years old. The parents were second cousins. They had seven children, five were normal and these two were cretins.

Mother died, aged 41, of cerebral hemorrhage. This girl was the first born; full term, normal delivery, weighed 8 pounds; was breast fed for three months, then artificially fed. Dentition took place at six months, but she stopped growing when between one and two years old. She walked and talked at seven years.

She has the large head and dwarfed body, with knock-knees, and a geographic tongue. Another point in this case to which I wish to call your attention is the enlarged but deficient thyroid. She is twenty-eight years old with a mental age of 2-10 and an I. Q. of .19.

Her sister, F. D., was born almost ten years later, December 2, 1904. She was born at full term; ordinary delivery; was the fifth child; was breast fed for two months. Teething occurred at seven months and she walked and

talked at five years. She has about the same physical characteristics and her thyroid is palpable.

This girl is a little brighter than her sister. She is nineteen years old and has a mental age of 3-6, giving her an I. Q. of 23.

They both menstruate irregularly. Their Wassermanns are negative and neither are epileptics.

They are very much devoted to each other.

This next case is one of the most interesting we have. W. A., this boy, was born January 14, 1886, at full term, in ordinary labor, and was the sixth child.

He was breast fed and was a strong baby, although his condition has been noticeable since birth. His Wassermann is negative. He is right handed. He is 42 inches tall and weighs 60 pounds. He is thirty-seven years old with a mental age of 5-2, giving him an I. Q. of .34. Therefore he is the brightest child in this group. Thyroid extract has quite a marked effect upon this boy's mentality, as well as his physical condition. He is not an epileptic.

This case of cretinism illustrates a type of the disease that is very rare in this country, but is met with more frequently in Switzerland,—that is, the large stature.

This boy, C. E. H., was born December 12, 1899, and was the first baby born to parents forty-eight and twenty-nine years of age, respectively. The mother had chorea when she was eighteen years old and had one brother who was feeble-minded, while the maternal grandmother was insane at times.

This boy has one sister living, well and healthy. He was born at full term, by a difficult instrumental delivery and weighed 8 pounds. His present condition began to manifest itself when he was three months old. He was a strong, healthy baby.

He walked at five years; talked at ten years. He is 5 feet 1 inch tall and weighs 150 pounds. He is right handed, and clean in habits. He illustrates very nicely the big thick tongue; the coarse, wiry hair; the supraclavicular pads; the barrel chest; and especially the dry, scaly skin. He is now past twenty-three years old but his mental age is less than three years.

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## STROPHANTHUS KOMBE: AN EXPERIMENTAL AND CLINICAL STUDY* **

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The employment of strophanthus by the general practitioner has been discarded to a large extent and its use is confined principally to cases *in extremis*.

Our constant demand for a drug to increase the strength and duration of cardiac systole, raise blood pressure and increase the tone of muscular tissue generally, leads us to the digitalis series, which includes digitalis, strophanthus, squills, Canadian hemp and lily of the valley. Disappointment in results has generally been due to variability of different commercial samples. The necessity for physiological standardization of this group has been amply established by numerous observers. Though digitalis itself has stood paramount in the treatment of circulatory diseases, strophanthus is the other member of this series that is of practical importance.

In our observations of this series, considerable work was done with digitalis and previously reported.[1] And in continuation, a study of strophanthus was begun to determine the potency and dosage of its various preparations.

I will not give, at this time, a detailed report of the entire experiment, but just mention a few important observations. Using the cat method of Hatcher as modified to our digitalis investigations,[2] securing continuous records with the string galvanometer, of cardio, respiratory, and blood pressure registration, it was found that strophanthus produces records practically identical with digitalis. Using the tincture of strophanthus (10 per cent) the toxic period developed at once, when only a scant percentage of the maximum lethal dose was injected; but by using a 2 per cent solution, an action similar to that found on using the 10 per cent solution of the tincture of digitalis was constantly observed clear through the lethal period. So with this smaller dosage as a guide, a clinical study was made using one-fifth regular dosages.

Our experimental work included the following derivatives of strophanthus:

Tincture Strophanthus Kombe. B. W. & Co.

Tincture Strophanthus hispidus. Department Pharmacy.

Tincture Strophanthus gratus. Department Pharmacy.

Solution Strophanthone (Kombe). P. D. & Co.

Solution Strophanthin (Kombe). B. W. & Co.

Solution Quabain (Arnold).

Solution Crystalline Ouabain.

As in the digitalis experiments,[3] a so-called therapeutic stage exists up to about 30 per cent of the minimum lethal dose, and a toxic stage above this point. In our strophanthus experiments hardly suf-

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ficient records were made to determine definite lethal percentages, but we are confident that in most of our results the lethal period was below our figured results. With the more concentrated solution, the 30 per cent period passed so rapidly that records show nearly an immediate toxic period; the weaker solutions gave, at best, a rapid onset of toxicity. The results are convincing to show that minimum doses give rapid digitalis action. Our results check very closely with those determined by Hatcher and Brody.[4] We secured in addition graphic records of the varying phases of the drug action.

Autopsies were made after each experiment; in all cases was found marked contraction of all abdominal viscera, including the bladder and intestines, extending up as far as the pyloris. The left heart was generally found in marked systole, the right in diastole, the auricles generally distended.

The use of strophanthus was brought to the attention of English observers by Dr. David Livingstone, the explorer,[5] and Sir John Kirk, then consul at Zanzibar. The therapeutic value was first demonstrated to the profession by Sir Thomas Frasier,[6] who isolated the active principle strophanthin and recommended this drug as a substitute for foxglove. The original plant was named by Professor Oliver of Kew, Strophanthus Hispidus De Candolle. The original drug was the dried ripe seeds and designated as Strophanthus Kombe. The United States Pharmacology of 1910 says that "Strophanthus is the dried ripe seed of Strophanthus Kombe (Oliver) or Strophanthus Hispidus (De Candolle); the chief substitutes are Strophanthus Hispidus and Strophanthus Gratus." Hirschfelder says, "according to the U. S. P., Strophanthus is prepared from Strophanthus Kombe," but Wilbert says "this is practically out of the market." As there are some twenty-eight species of the strophanthus family,[7] difficulties are presented in securing the true drug and substitution has crept in.[8, 9] Oftentimes better seeds of other species have given more satisfactory results than a poorer quality of the true drug.

Strophanthus Kombe seeds or green Strophanthus are obtained from a climbing plant indigenous to eastern tropical Africa.[10] An extract prepared from them is used as an arrow poison, as with the greater part of this group. The varieties which are substituted for the true Kombe seeds,[11, 12] are Strophanthus Hispidus, which is known as brown strophanthus, coming from the west coast of Africa; Strophanthus S. P., known as white or wooly strophanthus;[13] Strophanthus Gratus (Franchet) a brown seed but of different form than the hispidus. From Strophanthus Gratus seed is derived an active principle strophanine[14] which Arnand[15] found identical with crystalline ouabain; this later was called crystalline strophanthin-g, thereby causing confusion, as the terms crystalline ouabain and crystalline strophanthin have been used interchangeably by various authors.

Amorphous strophanthin,[16] the active principle of true Kombe, is a glucoside, whereas the active principle of the various substitutes generally contains a pseudo-glucoside which is twice as active as the true. This factor with that of the use of immature seed produces the varying results in therapeutic action.

The tincture of strophanthus (10 per cent) is the only form, besides the strophanthin, recognized by the U. S. P. The indications for its use are the same as for the tincture of digitalis, although in general the strophanthus preparations are more readily destroyed[17] by the juices of the gastro-intestinal tract. The British Pharmacopeia recognizes a tincture (2.5 per cent) and an extract to be taken internally. But better results are secured in the administration of the strophanthus series when given by the hypodermic syringe, subcutaneously, intramuscularly or intravenously.

Strophanthus is a cardiac stimulant and a diuretic analagous in action to digitalis. While more effective in increasing the force and lessening the rate of heart action, it does not constrict the blood vessels.[18] As a result it facilitates the treatment of impaired circulation due to a weakened myocardium, without its effect being antagonized by marked contraction of the blood vessels. It is less liable to cause nausea and gastro-intestinal disturbances than digitalis.[19]

Strophanthus is of great value in shock and collapse and threatened syncope. In the convalescence of children from myocardial and endocardial invasion, with kidney involvement; in senile heart patients with great dyspnea; in lung stasis and especially pneumonia,[20] and in chronic kidney lesions, the results are better than with digitalis. It may be considered a drug that can be generally used where digitalis is indicated and not feasible.

The physiological effects are: increased myocar-

dial tone with lowered heart rate,[21] diminution of dyspnea and palpitation, and increased kidney action due to flow through the renal vessels.[22]

The tincture is the only form that may be safely administered by the mouth. It may be given in doses 0.3 to 0.6 c.c. (5-10 m.). The majority of cases do not assimilate the drug readily from the gastro-intestinal tract. As it rapidly disintegrates,[23] one must constantly be on guard for the case that gives intense response to the smaller dose. Hence the minimum dose is preferable at first, with increase in a couple of days if there are no indications of overaction.

As strophanthus action is similar to that of digitalis, the previous administration of digitalis must be taken into consideration. The tincture has been given by inhalation with definite action.[24] The tincture may also be used hypodermically or intravenously in one to three minim doses by first slowly evaporating the alcohol and diluting with decinormal saline.

True Strophanthin Kombe used hypodermically produces little irritation, whereas the crystalline forms, or those of the substitution forms, are generally painful for some time following the injection.

The best results with strophanthus are obtained with the smaller doses of the true glucoside strophanthin, giving to the average adult hypodermically one five-hundredth of a grain (0.00013 gm.) to one two hundred and fiftieth of a grain (0.00026 gm.), one dose a day (or in emergency three doses), this for three to five days, then an interval of several days and another series. In shock, recovery is more prompt with the smaller doses. In fibrillation[25] of the auricles strophanthus is a wonderful drug. General improvement, lowered ventricular rate, less edema and dyspnea, improvement in kidney action follow its use; the tincture was used in a number of cases, improvement was marked but less spectacular than with Strophanthin Kombe.

In cases of asthenia with toxic myocardial factors, with the elimination of the pathology the use of the tincture, or better, the strophanthin by hypodermic[26] in small doses, is a valuable adjunct.

In cardiovascular diseases of childhood following contagious diseases, one seven hundred and fiftieth of a grain (0.00008 gm.) or less on alternate days, produces marked improvement. Senile individuals, including those suffering from cardio-renal disease, show increased myocardial tone, loss of edema and general improvement on the small daily dose. Strophanthus in small doses has given excellent results in pneumonia, even during the early processes, especially where the use of digitalis was not feasible. In chronic valvular heart disease with high blood pressure,[27] use of strophanthus in small doses gives excellent results.

The available forms of the true Kombe drug are the hypodermic tablet of strophanthin (Burroughs, Wellcome & Co.) rapidly soluble, causing little irritation, and the aqueous solution in a sealed hard glass container of strophanthone (Parke, Davis & Co.). Both houses also supply a reliable tincture for oral use. Finally, to secure strophanthus results, be sure you have Strophanthus Kombe with the name of a reliable firm. Remember it is one of the digitalis family; if it or another member of the series has been used, exhibit smaller doses to avoid toxic symptoms. Keep within the therapeutic range. Smaller doses produce better results than doses bordering on the toxic side.

## REFERENCES


1. Morris: Jour. Lancet, March 15, 1917, 36.
2. Morris-White: Arch. Inter. Med., 1918, 740.
3. Sollman: Pharmacology, 481.
4. Hatcher and Brody: Arch. Int. Med., 1912, x, 268.
5. Greenishes: Mat. Med., 1899, 4.
6. Frasier: Brit. Med. Jour., 1885, xi, 909.
7. Jelliffe: Drug Circ., 1896, 101.
8. Naylor: Pharm. Jour. Lond., 1905, xxi, 127.
9. Dohme: Apoth., Boston, 1905, xvii, 942.
10. Greenishes: Mat. Med., 1899, 5.
11. Greenishes: Mat. Med., 1899, 6.
12. Hatcher and Eggleston: Jour. Pharm. and Exper. Therap., xii, 407.
13. Holmes: Pharm. Jour., London, 1906, xxii, 312.
14. Sollman: Pharmacology, 497.
15. Armand: Comptes rendus de l'acad. des sci., cvi, 1011.
16. Sollman: Pharmacology, 499.
17. Hirschfelder: Diseases Heart and Aorta, 253.
18. Fraenkel: Arch. für exper. Pathol. und Pharmakol., Leipz., 1907, lvii, 79.
19. Munch: Med. Woch., Feb. 6, 1912.
20. Sollman: Pharmacology, xxii, 494.
21. Samaan: Chem. and Drug, xci, 1919, 8,023.
22. Hirschfelder: Diseases Heart and Aorta, 258, New York Med. Jour., March 23, 1914.
23. New and Non-off. Remedies, 1916, 96.
24. Hirschfelder: Diseases Heart and Aorta, 253.
25. Whiting: Proc. Royal Med. Soc., xi, 618.
26. G. Canby Robinson: Medicine, i, 1.
27. Steele: Index Treatment Disease, 8th edit., 398.

# CONCERNING MODERN RADIATION THERAPY AND ITS INDICATIONS IN THE TREATMENT OF CERTAIN BENIGN AND MALIGNANT CONDITIONS*†

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High voltage or short wave *x*-ray therapy as a means of combating malignant disease is now suffering the inevitable reaction from the over-enthusiastic statements of its early advocates. Reports emanating from Germany at the close of the war were so optimistic in tone that hope was aroused that this new method might be a specific for the treatment of carcinomata and sarcomata which had not already destroyed some vital organ. At the present time, much difference of opinion exists among workers and observers, not as to the specific action of these rays upon the cancer cells, but as to the selection of cases which offer hope of successful attack and the permanency of the cures which may result. It is the writer's opinion that the period of observation in this country is still too short for a proper appraisal of modern radiation therapy. Many of the failures have doubtless been due to improper technic and many others to a selection, either through necessity or choice, of cases not amenable to treatment.

*Action.*—The physiological action of radiant energy is fairly well established. Through its action upon the nucleus, cell division is delayed or wholly prevented, this action being more pronounced in young, rapidly multiplying cells, such as characterize carcinoma and sarcoma. Since the cancer cell is short lived, it soon becomes harmless if division is prevented. Heavy irradiation further stimulates fibrosis within the tissue stroma, and this tends to wall off, to choke, as it were, and thus to prevent the growth of those cancer cells not wholly devitalized.

*Technic.*—Since the lethal dose for most carcinoma cells is approximately the same as the epilation skin dose, the problem which must be met in a given case is to deliver this quantity of radiation to every part which is or may be the site of carcinomatous involvement.

*Procedure.*—As a matter of convenience, we let the arbitrary figure 100 represent this dose at the skin surface. A cross section of the part to be treated, as for instance the pelvis, is drawn upon transparent glass which is laid upon a standard anatomical cross section of this part of the body and the various points of involvement sketched in. By means of tables based upon the voltage, distance, filter and size of ports employed, it is now possible to determine the exact percentage of radiation reaching any one of these points through each port of entry. By a simple process of addition, the operator may readily determine the dosage required through each port to give from 100 to 115 per cent of an erythema skin dose to every depth point. The calculation must take into consideration the size of each port of entry, since it is found that secondary radiation is greater in the larger ports and is an important factor in making up the aggregate dosage. In the preparation of such a chart, it is often found impossible to reach the cervix with a full 100 per cent without doing irreparable damge to the skin and superficial tissues. In this event, radium is employed within the cervix to bring the percentage up to the required amount. Technical difficulties are much greater in treating lesions which lie but a few centimeters beneath one surface, since it is often more difficult to administer a lethal dose to subcutaneous tissue without permanent injury to the skin.

*Preparation of the Patient.*—The tissue and blood changes resulting from heavy irradiation are so great that the proper preparation of the patient becomes of the first importance. Careful blood and urine examinations should be checked between each course of treatment and may be the means of avoiding serious complications. Normal saline protoclyses should be given daily throughout the series. The amount of radiation to be given on any one day should, as far as possible, be kept within the easy toleration of the patient, since it is highly desirable to avoid severe irradiation sickness. Diet should be limited to liquids, but these should be forced as much as possible.

*Pre-operative Treatment.*—Since there is much experimental evidence to prove that the irradiated cancer cell will not reproduce itself when transplanted, it is probable that much might be gained in statistical results by the routine pre-operative radiation of all operable cases. After this is done,

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Fig. 1

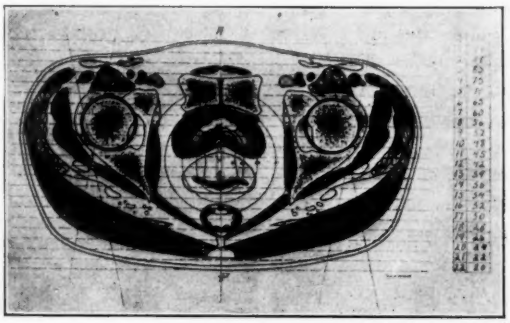

Fig. 2

Figures 1 and 2 (after Schmitz) illustrate the method of determining the combined intensities of radium 8 x-rays at different depths.

however, a period of from ten days to three weeks should elapse before any radical procedure is attempted. This position is taken for two reasons: (1) the post-irradiation blood changes greatly increase operative mortality; (2) the height of the effect of radiation upon the organism is not attained until about the tenth day and then is maintained for three or four weeks.

*Post-operative Radiation.*—While the writer continues to advocate post-operative treatment when operation has been performed before he is consulted, it is probable that this is not so effective as pre-operative treatment. There are several objections to post-operative irradiation as a reliable procedure:

1. Radium cannot be used effectively because there is no localized point of attack.
2. Cancer cells may have been picked up by the open lymphatics during the operation and carried to some distant organ beyond the reach of any radiation.
3. Post-operative complications may render it difficult or impossible to properly treat the patient until too much time has elapsed to accomplish the greatest good.

### CLINICAL APPLICATION

The success with which radiation attack is attended varies greatly, depending upon the part of the body involved. Hence the clinical aspects of this paper will deal with cancer in different anatomical locations.

*Uterus.*—Cancer of the cervix and fundus uteri come under different classifications for the following reasons: In carcinoma of the fundus, surgical

Fig 3

Fig. 4

Figs. 3 and 4 show the effect of radium upon a carcinoma of the lower lid.

results have been good and probably cannot be improved upon by any known method of treatment. On the other hand, the results of surgical treatment in carcinoma of the cervix, regardless of the methods employed, have been far from satisfactory. But a small percentage of cases presenting themselves for treatment are operable and of these a small number die from post-operative complications and a larger number from recurrent or metastatic carcinoma.

If one employs radiation therapy, he is not so restricted in his selection of cases, since it is only the far advanced, utterly hopeless case which needs to be rejected. There is practically no immediate mortality. In the advanced inoperable cases, there is usually very satisfactory palliation and occasionally a temporary or symptomatic cure.

Border-line cases seem to offer a much larger percentage of three to five year arrests than were ever obtained by the most radical surgical procedures. Early operable cases have rarely been treated by radiation alone, since the time has not yet come when one may feel justified in recommending complete reliance upon radiation without the benefit of early surgical removal.

Based upon these considerations, the writer has taken the following position relative to the treatment of carcinoma of the cervix to be held until further data are available which may tend to modify that position:

1. There should always be an early consultation between the surgeon or gynecologist and the radiologist to correctly classify the case and to map out the proper therapeutic procedure.

2. Those cases considered by the surgeon to be readily operable should have radium applied to the primary lesion. After a lapse of at least ten days, a radical operation should be performed. As soon as possible thereafter, the patient should be submitted to short wave *x*-ray radiation to the entire pelvis.

3. All border-line cases should be advised to

Fig. 5

Fig. 6

Figs. 5 and 6 show the favorable action of radium upon angioma with malignant manifestations.

rely upon radiation therapy, and this should be given with the most scrupulous thoroughness. Ultra-violet radiation should be employed both before and after this treatment to counteract its harmful effects.

4. The more advanced inoperable cases should be given the same thorough radiation therapy not only to control hemorrhage, foul discharge and local symptoms, but in the hope of arresting the disease.

5. There is another class for whom nothing can be offered even in the way of palliation. These are the cases with extensive cachexia and wide involvement of contiguous organs, such as the bladder and rectum.

As previously stated, the writer regards his own statistical data as of insufficient volume and duration to be of value, but believes that the citation of the few outstanding cases in his series of sixty-four cases of carcinoma of the cervix may add some weight to the above conclusions.

Mrs. O. K., first treatment November 15, 1919. Eight months previously she had noticed a slight bleeding after an enema which she attributed to hemorrhoids. Three days before treatment she had a very severe hemorrhage only controlled by packing the vagina. Examination showed extensive fungoid mass involving the entire cervix and extending upward on the right side along the broad ligament. There was profuse discharge with a very foul odor. The mass bled freely on slight manipulation. Microscopical diagnosis was not made but there was no doubt in the minds of several consultants that the case was one of advanced malignancy. Fifty mg. of radium for sixty hours seemed to completely control the hemorrhage and the discharge. From December 4th to March 2nd she was given three courses of *x*-ray treatments through the abdomen and back. There has been no recurrence and the patient is apparently in perfect health.

Miss Anne B., first examined May 12, 1921. There had been metrorrhagia for the past three months. There was marked fixation of the uterus, the cervix was ulcerated and deeply infiltrated and the infiltration extended upward toward the left broad ligament. The patient was placed in the knee-chest position and radium needles were embedded around the area of apparent involvement. Later she was given a single course of *x*-ray treatments through the abdomen and back. This patient was last seen on March 1, 1923. At that time there were no signs of recurrence, the uterus was freely movable and normal to inspection and palpation, and the patient's general health was excellent.

Both of these cases were referred as inoperable carcinoma of the cervix and while no sections were made for microscopic study there is little doubt as to the diagnosis, especially in view of their response to radiation therapy.

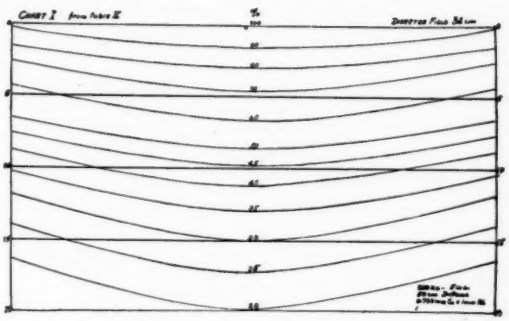

Chart I

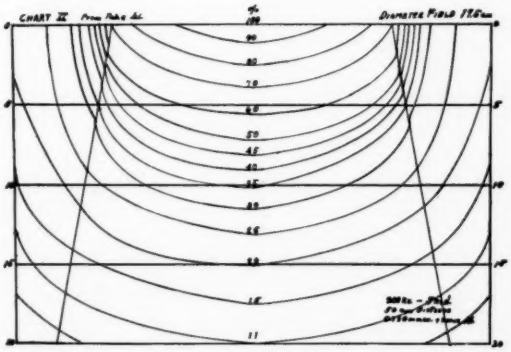

Chart II

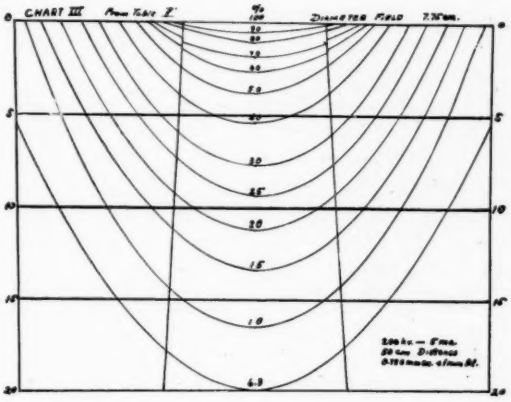

Chart III

Charts 1, 2 and 3 serve to illustrate the difference in percentage—depth—dose with ports of different diameters.

*Breast.*—Owing to the position of the primary disease, much nearer the anterior than the posterior surface, the treatment of breast cancer offers difficulties not encountered to the same degree in the treatment of pelvic cancer. While it is usually possible to deliver as much as 65 to 70 per cent of the epilation skin dose to the entire breast area through the anterior chest wall, the raising of this percentage to the required 110 per cent offers very great difficulties. This is especially true in women with deep chests.

If one is able to deliver as much as 30 per cent to the carcinomatous area from the back, about 17 per cent reaches the anterior skin surface to add to the dose already given, which is more than the skin will tolerate. In a measure, this difficulty is overcome by increasing the percentage depth dose through the expedient of increasing the distance between the skin and tube target and employing larger ports of entry.

Some of the best results which the writer has seen were obtained with the technic employed about three years ago, when we were using lower voltage, lighter filtration, a long distance and treating between three and four hours through the anterior port. This was supplemented by attack through multiple ports of back and sides. Some of these patients who showed unmistakable intra-thoracic and supra-clavicular metastases have been kept alive and in a fair state of health for from three to five years.

When it is possible to supplement the *x*-ray treatment with embedded radium needles, we are apparently able to do more toward causing an arrest of the active malignant disease. While results have been disappointing, regardless of the technic employed, it must be borne in mind that the only cases received for treatment have been the advanced inoperable ones or those presenting post-operative metastases. In some of these, we apparently are able to completely arrest the progress of the disease, while in others, similar in all respects, the radiation seems to be of little avail.

I still believe that axillary metastases are best treated by means of the radium pack. In the light of my own observations, without regard to published statistics of others, I have little hesitation in taking the position that all operable breast cancer cases are primarily surgical and that radiation therapy should be regarded as a reinforcement agent. I repeat, however, that the surgeon is scarcely justified in hastening to operate without first giving careful consideration to the question of pre-operative and post-operative radiation.

*Case Reports.*—Mrs. Bessie K., of St. Paul. Halstead operation for cancer of the breast performed in April, 1918. In November, 1919, she noticed a small growth attached to the chest wall and in January, 1920, another bunch above the clavicle and a small mass was found in the right axilla. She was referred to me for treatment in February, 1920. A combination of *x*-ray and radium was employed and all of the tumors were controlled with the exception of the one above the clavicle, which proved very obstinate. This finally disappeared but a large area of skin was destroyed by the repeated *x*-ray treatments. Ulcer finally healed with a deep scar. No treatments were given from January, 1920, until February, 1923. At this time a mass developed above the scar in the neck. This had all the characteristics of metastatic carcinoma. Following heavy *x*-ray radiation repeated once after a four weeks' interval, the mass disappeared and there has been no further evidence of recurrence.

Miss Mary P., aged 69, was referred to me in November, 1920, with a diagnosis of carcinoma of the left breast. There was a movable mass in the upper left quadrant and readily palpable glands in the axilla and above the clavicle. An *x*-ray examination of the lungs was negative. Radiation therapy was instituted and continued at intervals of four weeks for six months. There was immediate improvement and after three months no tumor or glands could be palpated. There has been no recurrence to date.

These two cases represent two wholly different groups. The first was a post-operative metastatic recurrence and undoubtedly owes the prolongation of her life to radiation. The second is open to question as to diagnosis, since no section was made. Clinically, however, it was a case of carcinoma with multiple metastases. The cases are reported chiefly to show that we are justified in treating all inoperable breast cancers, even though most of our end results have been unfavorable.

*Skin Cancer (Epithelioma, Basal Cell, Spindle Cell).*—Basal cell type will usually give good results regardless of the method employed to eradicate it, but the cosmetic results obtained by the combined use of radium and ultra violet rays leave little to be desired. Although I have treated a large series of cases with this diagnosis, only two have failed to respond properly to radiation. If they do not respond favorably after the first hyperintensive irradiation, further treatment along this line is probably contraindicated. Epithelioma of the prickle cell type will usually heal promptly, leaving a soft, pliable scar, and experience seems to justify radiation treatment of these cases when received relatively early. It must be borne in mind, how-

ever, that no treatment is too radical since the lesion is an exceedingly dangerous one. I believe that with the conjoined use of ultra violet rays, it is possible to employ about 50 per cent more radiation than would cause an epilation of the normal skin. The cervical lymph nodes (in cancer of the lower lip) should always receive heavy radiation given with the same technic employed in breast carcinoma.

*Unfavorable Types.*—I have seen no encouraging results from the treatment of carcinoma of the tongue, epithelioma of the buccal cavity or of the rectum. Results in carcinoma of the vaginal wall have been unfavorable, also, although in some instances the immediate results seem to be good. I have one case apparently cured. In this case, very heavy irradiation was given to all of the surrounding tissues with the intention of producing an intense fibrositis to block off all of the lymphatic drainage from the part. As a result of this, a late post-radiation necrosis occurred several months after treatment. We must teach the public not to be too critical when these untoward effects result. Just as the surgeon who is too conservative does not cure cancer, so the radiologist who fears criticism too much may fail to accomplish the greatest good. An intense fibrosis in the deep tissues may cause a local necrosis, but this is not dangerous to life and should receive little consideration when one is treating malignancy.

Relative to cancer of the tongue, the best results now being reported are obtained by means of electric coagulation supplemented by radiation. I have recently treated two cases by this method and hope to report results at a later date.

*Non-malignant Disease.*—Not in the treatment of malignancy, which is a discouraging undertaking at best, but in that of certain non-malignant types of disease, does the radiologist reap his greatest reward in satisfactory results. Here, too, he meets with sharper objections from the surgeon because it is this same class of cases which have given him his best results.

*Myoma of the Uterus.*—These cases are divided radiologically into two classes: (1) those of relatively small size producing no pressure symptoms; (2) those of larger size (four months pregnancy or larger) usually producing some pressure symptoms.

Both classes of cases are amenable to radiation therapy, but in the latter group there are more arguments in favor of surgical removal. Radiation will control menorrhagia at any age, but since it is not always possible to control symptoms without producing a permanent menopause, the method may be subject to this contraindication in women under thirty-five years of age. With these exceptions, it may be conservatively stated that there are no contraindications to radiation therapy in myoma or its essential symptom, menorrhagia.

The following advantages are suggested:

1. If the loss of blood has been severe, the patient is often a poor surgical risk, while the simple application of radium is practically without danger.

2. The patient is often able to continue her occupation without interruption.

3. Patients will often submit to radiation much earlier than they will to surgical intervention.

4. The procedure is successful in practically all cases, and there is no operative mortality.

*Technic.*—The choice of radium or *x*-ray depends upon the case itself and the judgment of the radiologist. I prefer the use of radium in the more acute cases somewhat bled out from hemorrhage, when hospital care is indicated in any event. Usually there is one rather free menstrual period following the treatment, but after that the menopause transpires rapidly. On the other hand, the ambulatory case, which is not so urgent, may be treated to better advantage with *x*-rays. In these cases, I prefer relatively light dosage with the intention of producing a cessation of menstruation after about three months of treatment. A few cases of essential menorrhagia or metrorrhagia have been treated with marked success and without producing a cessation of menstruation. Results have been so uniformly satisfactory in the writer's experience that he now considers radiation the method of choice in all cases of menorrhagia due to myoma in women beyond the earlier child-bearing age.

*Case Reports.*—Miss W., aged 36. Unmarried. Occupation, clerk. Chief symptoms, menorrhagia. Duration, eighteen months with progressively increasing severity. Hemoglobin, 65 per cent. She is well nourished but complains of tiring easily. One tumor the size of a three months' pregnancy can be palpated. On May 27, 1922, 50 mg. of radium, filtered with 1 mm. of brass and 0.5 mm. of silver were inserted into the cervix and allowed to remain twenty hours. On June 14th, 17th and 31st she was given *x*-ray treatments through four ports. On July 16th a menstrual period occurred and lasted four days but the flow was not excessive. Since that time there has been no

menstruation and the patient's health and strength are now above her previous normal. Hemoglobin, 90 per cent. She has lost but one day of work.

Mrs. S., aged 48. Married. No children. Occupation, business woman. Menstruation normal until March, 1921, when it became excessive. Following this there was no complete cessation in the flow, which merely became more profuse at regular periods. Examination showed a somewhat enlarged uterus, retroverted with a large mass in the right half. Marked anemia. She was first given *x*-ray treatments on September 16th and flow ceased at midnight for the first time in seven months. Recurrence at next period, when she flowed for ten days. In November she received another course of *x*-ray treatments. On December 3rd she had 1,000 mg. hrs., the radium being packed in the cervix and cul-de-sac. An unexplained temperature of 103 degrees made it advisable to remove the radium. The temperature promptly dropped to normal and on December 5th she received an additional 600 mg. hrs. There was a slight flow the following month, but since that time there has been no menstruation.

Dr. H. M. N. Wynn recently made a pelvic examination and reported everything normal.

The above case is selected for report because it was one of the most obstinate of my series.

Miss A. C. S., aged 47, was referred by Dr. Litzenberg in March, 1920. Dr. Litzenberg stated that there was no demonstrable tumor but there was a history of severe menorrhagia for the past ten years. Patient stated that this seriously interfered with her work and that she was completely exhausted when evening came. She received one course of *x*-ray treatments during March and all menstruation ceased for one year. At this time bleeding recurred and she was given one treatment through four ports of entry on June 23, 1921. Since then there has been no bleeding. Patient states that life is enjoyable for the first time in ten years.

*Exophthalmic Goitre and Hyperthyroidism.*—The literature contains such widely variant opinions relative to the efficacy and justification of radiation therapy in these conditions that much confusion apparently exists. The purpose of radiation here is to produce a mildly depressant effect upon glandular activity and with proper technic it seems possible to accomplish this in a large percentage of cases. If the metabolic rate is high and the classical symptoms are rather pronounced, there is nearly always a marked improvement from the first. The cases which fail to respond favorably are those with only a slightly increased metabolic rate and rather indefinite symptoms. On the other hand, the frank exophthalmic cases with classical symptoms will improve progressively for months or years after radiation. On the whole, I believe that carefully compiled results would compare quite favorably with those of surgery, but time does not permit such a compilation of my own cases for this paper.

# THE TONSILS*

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It is difficult to present anything new about the tonsils as a focus of infection in childhood or to demonstrate cases unlike those seen in routine practice. The reason for this is that the tonsil was the first organ recognized as having a relation to systemic conditions. As far back as 1789 Eyerlin[1] considered the relationship of tonsillitis to rheumatism as clinically evident. Since this time a vast amount of literature has accumulated on the subject. In the last twenty-five years, approximately 250 papers have presented research or clinical data to prove this association from a scientific standpoint.

Many medical subjects have been discussed in cycles. This is true of focal infections in general and at some stages the tonsils have been unduly emphasized as a source of infection.

One is astounded at the extensive list of ailments of which the tonsil is accused of being either a direct or contributing etiologic factor, not only by the laryngologist but by the internist, the surgeon, the dermatologist, the orthopedist and other students of special branches of medicine. The pediatrician, not to be outdone, has found few conditions in the general literature which have not been recognized in children, and, in addition, a few disorders peculiar to childhood. One most important fact that has been conclusively proved is that the tonsils may be foci of infection which are only manifest by remote general symptoms when the tonsils have never given cause for suspicion.

The anatomy of the tonsils shows that they are practically aggregations of lymph nodes covered by epithelium. Indentations are present, forming crypts. Positive definite knowledge of the physiology of the tonsil is unknown. There has been, however, on account of this lack of knowledge, much speculation. They are regarded, like other lymph nodes, as exercising a protective function. They act as a sieve—"the first line of defense"—against microbic invasion. Stohr has shown that the tonsils are filled by an enormous number of

*Presented in the Pediatric Clinic before the Southern Minnesota Medical Association at Faribault, June 11, 1923.

leukocytes, which show a sort of migration toward the surface.

The rôle played by the tonsils in the production of lymphocytes has been conclusively demonstrated by Wood. He regards this as a most important function. Pierson showed that large numbers of lymphoid cells pass through the tonsils into the oral cavity, to become the salivary corpuscles. Changes in the speaking and singing voice have been noted after removal of the tonsils. This may be due to the fact that the palatoglossus and palatopharyngeus muscles are never wholly normal in their action following tonsillectomy. The theory has been advanced that the tonsils develop an internal secretion similar to the suprarenal glands. It is interesting to note, however, that so eminent a pediatrician as Dr. LaFetra has stated that he has never been able to note any abnormality in growth or development in the boys and girls whose tonsils had been removed in early childhood. Whatever advantage the tonsils may have physiologically, it would seem that Nature has provided sufficient other tissue of that same sort to take up vicariously the work of the tonsils when these are removed.

A well founded impression exists that children whose tonsils have been removed are less susceptible to respiratory and gastrointestinal disturbances. If measles, scarlet fever or diphtheria are contracted, certain obstructive symptoms are less evident and the disease is less pronounced. Part of this may be due to the better physical condition of the children.

The gross appearance of the tonsils when considered alone may give very little indication of their power for harm. As a rule, the dangerous tonsil which is a carrier of disease or a focus of infection is not large, and is usually without any evidence of local inflammation on its surface. It may show the effects of adhesions or be buried by the pillars. Tonsils capable of reacting to an acute infection are usually of good size, exhibit a large drainage surface between the pillars, and are usually not the cause of chronic disease but of strictly local involvement. When inflamed temporarily, the child may develop a grave systemic disturbance. Certain conditions peculiar to childhood are not regularly associated with the tonsils as a source of infection. In other conditions too much stress has been laid upon them as a focus. Some of the former I wish to discuss this morning.

### ATHREPSIA

One of the most difficult chronic conditions that the pediatrician has to deal with in very young infants is athrepsia (marasmus, atrophy). In certain children there is an inherent weakness produced by a more or less unsuitable environment. Structural abnormalities are frequent causes of this condition, the most common of which are malpositions of the heart, and changes in the central nervous system and genito-urinary tract. When our knowledge is exhausted we take refuge in a "constitutional factor" or diathesis, but it is always with a feeling that something may have been overlooked. We talk less of such conditions as our actual knowledge increases in regard to processes going on in the organism.

In addition to these we must also consider parenteral infections. They are just as often the cause of the poor nutrition as they are the result. The artificially fed infant has less reserve energy than the breast fed, and less immunity to disease. Parenteral infections are frequently overlooked, especially if occurring without febrile reactions. Such an infection may disappear without sequelæ, but if repeated may result in a definite focus of infection in the tonsil. The reserve energy is decreased. This results in a stagnation of food, as has been previously known, with a colon bacillus invasion of the upper intestinal tract. This initiates a nutritional disorder. A parenteral infection may leave the infant constitutionally weak, but the infection is, nevertheless, the original factor in the nutritional disorder.

### FOCAL INFECTIONS IN RELATION TO DIGESTIVE DISTURBANCES IN OLDER CHILDREN

Focal infections and the series of symptoms arising in the digestive tract play a much more prominent part in childhood than in the adult. These may manifest themselves in simple cases as anorexia and capricious appetite. In acute cases of pharyngitis food may be actually refused due to local pain in the throat or the effect of the prostration. The throat, in such cases, will be seen to be red and swollen, and with a loss of luster. With the passing of the acute stage of the infection the symptoms improve. If the appetite is persistently poor or capricious, the tonsils should be carefully examined again. If there is a persistent mucopurulent discharge from the back of the nose, it is easy to assume that enough of this material when

swallowed may set up a chronic gastric disturbance. That such material is swallowed can be easily demonstrated by gastric lavage.

Again, we may have to assume that there may be a chronic toxic effect on the nervous system in certain susceptible individuals, so that the loss of appetite, as in the adult, is to be regarded as a functional neurosis.

A coated tongue and foul breath are also not infrequently associated with enlarged tonsils. When not due to decayed teeth or to a demonstrable error in diet, infections of the nose and throat must be considered.

It must always be borne in mind that the child may not complain of any discomfort in the nose and throat, even in rather serious acute infections. Chronic muco-purulent discharges from the nose or into the pharynx may be observed by the mother. The tonsils may look innocent at one examination, and only the enlarged glands at the angle of the jaw indicate that infection is or has been present.

If this train of symptoms described above persists, it leads to a condition we have learned to describe as "malnutrition," or a certain definite percentage of underweight as compared to a normal child of approximately the same age and height.

It is to be remembered that if tonsillectomy is decided upon the patient is likely to be distinctly below par before the operation. As a result of a temporary withdrawal of food, the operative shock, anesthesia, etc., the child is in still poorer condition after the operation. The end results will be disappointing in many cases if the physician depends for his cure entirely upon the tonsillectomy. The after-care of the child must be carefully supervised. Strict dietetic and general hygienic measures should be instituted as soon as possible.

One of the most enlightening statistical papers, in regard to the occurrence of malnutrition in children with diseased tonsils, is that published by Kaiser.[2] Of 1,200 children operated on for diseased tonsils and adenoids, 34 per cent were nutritionally substandard. Reexamination one year later showed a reduction in malnutrition of 18 per cent. That diseased tonsils and adenoids do not necessarily impair nutrition is evidenced by 66 per cent of the children showing normal weight according to height. These figures should be kept in mind in attempting to determine the importance of the tonsil as a focus of infection in nutritional disturbance in older children.

### CYCLIC VOMITING

The usual course of an attack of cyclic vomiting is familiar to most physicians. The symptoms are similar to a simple "bilious attack," with fever, nausea, abdominal pain, and following this the passage of a light colored stool, with or without mucus.

The diet has little, if anything, to do with the etiology, and attempts to control the disease by regulation of the diet have not given the results that were expected. This is not always due to the fact that the dietary supervision was not strict enough or that there was a lack of cooperation on the part of the parents or the patients themselves.

In my personal cases, at least 50 per cent presented a history of one or both parents being afflicted with migraine.

Peculiar metabolic disturbances were pointed out by Sedgwick and others, occurring between the attacks, which has led to the belief that these might play an exciting rôle and be characteristic of the disease. Such findings have been noted, however, in other conditions, and when found are not always associated with migraine or tonsillar infection.

The fact that most of these cases occur in the upper classes suggests that something in the manner of living may play a significant rôle.

Finally, we have to consider the possibility of infection in the tonsil as cause of these attacks. Sedgwick[3] reported a series of cases which were strikingly benefited by the removal of tonsils. In a personal communication received some years ago he stated that some demonstrable pathology should be observed in the tonsil before attributing vomiting to this cause. Later Taylor,[4] before this Society, reported a series of cases in which tonsillectomy was performed with excellent results. In Byfield's[5] series, 70 per cent of those operated upon were reported as absolutely cured.

Such results seem to fortify the assumption that in the periodic vomiting of children focal infection plays the exciting rôle. When this infection is removed these children endure better nervous strain, fatigue, general diet, anesthesia, or whatever else may lead to the acute gastrointestinal disturbance and to excessive ketone formation. The diet, of course, should be regulated, while fatigue and undue nervous strain should be avoided.

If the focal infection is limited to the tonsils and adenoids, the prognosis is excellent in typical cases after tonsillectomy. If, after the removal of these structures, attacks still continue, careful examination of the nasal sinuses may suggest some further conservative surgery. The appendix has been removed with good results only in rare instances.

I do not wish to be understood as asserting that all cases of cyclic vomiting follow focal infection in the tonsils, adenoids or nasal sinuses. Particularly in the neurotic child we are frequently unable to demonstrate any source of focal infection. Anaphylactic phenomena may be a factor in such children.

### PERITONITIS

I have been so unfortunate as to see one case of general peritonitis following a streptococcic sore throat. The throat symptoms had entirely disappeared four days before I saw the case. At the time of the first examination there was fever, rigidity of the recti more pronounced on the right side, tenderness over McBurney's point, abdominal distension, vomiting and constipation. Peritonitis, presumably secondary to a ruptured appendix, was diagnosed. At operation the appendix was found to be normal, but immediately below it free pus was found and an extensive peritonitis. A streptococcus was isolated which was culturally identical with a streptococcus obtained from the tonsils.

### THE TONSILS AND SCARLET FEVER

Infected tonsils, the one constant lesion in scarlet fever, is regarded as a focus of infection. It is held by Bullowa[6] that the severity of the infection is conditioned by the anatomical relation. He points out that rhythmic swallowing movements, when they compress the tonsils, force toxins or organisms into the lymph stream, with subsequent inflammatory reaction in the adjacent lymph nodes. He advocated incision of the plica or, in certain selected cases, tonsillectomy.

In a fairly wide experience with scarlet fever I have yet to see an occasion where such interference was indicated. In cases of long duration, with unusually persistent complications, this measure may justify consideration.

Byfield[7] reports a case which, during convalescence from scarlet fever, presented considerable muco-pus in the nasopharynx. After each meal, the child would calmly turn its head to one side and eject its gastric contents. Following the removal of the tonsils and adenoids this regurgitation at once ceased.

### ARTHRITIS DEFORMANS IN CHILDREN

In this rather rare disease, when occurring in children less than three years of age, the portal of infection seems to be limited to tonsils and adenoids. It should be remembered, however, that sinus infections have been demonstrated during the first weeks of life.

The prognosis of arthritis deformans in uncomplicated cases is good so far as the arrest of the disease is concerned. The deformity and functional disability may persist for a considerable time.

### ACUTE SUPPURATIVE ARTHRITIS

In contrast to the above, invasion of the joints and periarticular tissues by pyogenic organisms in infants is by no means a rare condition. The inflammation of the joints is practically always secondary to an infection in the epiphyses. Clinically there is swelling, tenderness and considerable induration. The overlying skin is not involved until late in the course of the disease, so that redness is not observed early. The constitutional manifestations are few when compared with infection elsewhere in the body. The common conception seems to be that purulent arthritis always follows a focal lesion and the tonsil is usually assumed to be the point of infection. As a matter of fact, the focus of infection is indeterminable in the majority of instances. In infancy the infecting organism in more than half the cases is the pneumococcus. The frequency with which the pneumococcus invades the blood stream of the young without involving the lung is notorious. In a series of cases reported by Johnson,[8] a few had had pneumonia some weeks previous, but the relation between the original infection and the arthritis was not clear. In Johnson's series of cases, less than half gave a history, or showed on examination when admitted any definite source of infection.

After removal of the original focus, if arrest of the disease is not secured, it must be remembered that the first joint involved (fortunately this is usually a monarticular disease) may have become a new focus, for practically all of these conditions are purulent. The only conditions which have to be excluded in the differential diagnosis are scurvy

and hemophilia. A few young infants develop syphilitic inflammation of the joints following involvement of the epiphysis, and, as a medical rarity, an arthritis may follow ophthalmia neonatorum or result from a gonorrheal vaginitis.

### ABDOMINAL PAIN IN THROAT INFECTIONS

We are indebted to Brennemann[9] for an excellent article emphasizing the relationship between abdominal pain and throat infections. According to this author, it may occur either before, during, or after an acute throat infection. The nature and location of this pain are fairly constant. Very frequently the pain in the abdomen is the only thing complained of. Occasionally it lasts for weeks and even months after all other symptoms have disappeared. It may be more or less constant; more often it is distinctly intermittent. The pain may be slight and transient or the child may cry with it over a period of hours.

In the intermittent type the patient may merely distort his face, squirm, turn over on his side, or he may scream with each new attack. The abdomen is only exceptionally distended and tenderness on pressure is often absent.

When asked to locate the pain with the tip of the finger, the child will point to the umbilicus. Rarely the pain is diffuse, or more on one side than on the other.

Without this condition in mind, a diagnosis may be difficult. In a few cases, laparotomy, either frankly exploratory or based on a wrong diagnosis, has been made.

Why this pain occurs is not definitely known. Brennemann directs one's attention, however, to the mesenteric and retroperitoneal glands, and cites many cases to bear this out. That it does occur in infections having their primary seat in the throat is evident from autopsies on cases dying from influenza during the recent epidemic.

The cause of the enlarged glands is again a matter of speculation. Two roads of infection are possible, according to this author: (1) by the blood stream; (2) by direct transmission. The former seems improbable, for a marked general adenopathy is not especially characteristic of these infections. A selective localization is possible, as in many other infections, such as typhoid and pneumonia. A frequently occurring cervical adenitis is not an analogous phenomenon, for here the invasion is manifestly along the lymphatics, and is strictly local.

The condition is of importance because of its frequency. As mentioned above, several children have been operated upon on insufficient diagnosis. If infected tonsils as a source of abdominal pain is kept in mind, this condition will cause us little concern.

### BIBLIOGRAPHY


1. Eyerlin: Materia rheumatica ad tonsillitis.
2. Kaiser, A. D.: Effect of tonsillectomy on malnutrition in 1,200 children. Am. Jour. Dis. Child., 23, 139, (Feb.) 1922.
3. Sedgwick, J. P.: Studies of recurrent or periodic vomiting. Am. Jour. Dis. Child., 3, 209 (April) 1912.
4. Taylor, Rood: Minnesota Med., 2, 61 (Feb.) 1919.
5. Byfield, A. H.: The beneficial effect of tonsillectomy on cyclic vomiting and allied affections. Tr. Sect. Dis. Child., Am. Med. Assn., p. 60, 1921.
6. Bullowa, J. G. M.: The tonsil and scarlet fever. Am. Jour. Dis. Child., 22, 29 (July) 1921.
7. Byfield, A. H.: The relation of respiratory infection to digestive disturbances in infants and children. Jour. Iowa State Medical Society, Nov., 1918.
8. Johnson, F. E.: A study of seventy-three cases of acute arthritis in infants. Am. Jour. Dis. Child., 21, 170 (Feb.) 1921.
9. Brennemann, Joseph.: The abdominal pain of throat infections. Am. Jour. Dis. Child., 22, 493 (Nov.) 1921.

# MINNESOTA MEDICINE

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## EDITORIAL

### The State Meeting

Medical meetings come and go. This much may be said of the 1923 annual meeting of the Association held in St. Paul in October—in every way it was one of the best meetings we have ever had.

The registration of 550 was second only to that three years ago in St. Paul. This was in large part due to the extraordinarily fine program arranged by the officers of the sections, who constitute the program committee. The local Ramsey county committees, too, deserve special credit for the manner in which the association was entertained. Banquets as a rule incline to drag and have been considered a questionable asset. This cannot be said of this year's banquet when over 350 guests were dined and entertained by the snappy program.

The most important action taken by the House of Delegates was in the matter of the handling of committee reports and their recommendations. In the future, the gist of committee reports will be published in MINNESOTA MEDICINE for review by the county delegates, in advance of the meeting, and recommendations of the various committees made at the first meeting of the House will be referred to the proper standing committee, or one to be specially appointed for consideration, and report at the next meeting of the House during the same session. This procedure should eliminate perfunctory acceptance of recommendations by the House itself.

The election of officers for the calendar year 1924 resulted as follows: President, Dr. Archibald MacLaren, St. Paul; first vice president, Dr. E. T. Sanderson, Minneota; second vice president, Dr. F. J. Hirschboeck, Duluth; third vice president, Dr. C. W. Bray, Biwabik; secretary, Dr. Carl B. Drake, St. Paul; treasurer, Dr. F. L. Beckley, St. Paul. Dr. F. R. Weiser, Windom, was re-elected Councilor for the Sixth District and Dr. W. F. Braasch, Rochester, for the Eighth District. Dr. J. C. Litzenberg, Minneapolis, was elected to act as delegate to the next meeting of the American Medical Association with Dr. O. W. Parker, Ely, as alternate.

It was also decided by the House of Delegates to accept the invitation to hold the next annual meeting at St. Cloud. The previous objections to this city for convention purposes have now been obviated by the completion of a new hotel and the construction of the concrete highway from the Twin Cities.

### Non-Diabetic Acidosis

Since insulin has been proven to be a specific for diabetic acidosis, it is fair to study afresh the known factors back of non-diabetic acidosis. A survey of recent literature shows only one brief report from Talheimer, of Milwaukee, on this subject.

It is clear that elderly patients with clinical diabetes, may appear to be acidotic, but prove to be failing from wide-spread vascular changes with severe central nervous system depression. Insulin can only be expected to replace, in these patients, the one defect—that of Langerhans' island deficiency. Severe physiologic disturbances due to other causes will not be eliminated.

Ketone bodies are known to accumulate in the blood in various infections (particularly in the

young), so that acidosis may become a severe menace. The lack of any evidence of diabetes in these cases disposes of the idea that inability to provide native insulin (hormone) is back of it. We must therefore assume either that the native hormone is depressed or neutralized (Wilder) just as it is known to be during periods of infection in proven diabetic, or we may assume that other unknown factors, not excluding those of central nervous origin, may be in control. If this influence comes via the sympathetic nervous system it is easy to postulate that temporary adrenal overfunction soon rids the body of all its reserves of stored glycogen. If in addition there has been little intake of food (post-anesthetic), the available glucose being absent, the depots of bodily fat could easily supply the ketogenic pabulum. Accordingly, if insulin were administered, glucose must needs be provided and *retained*.

This is a good time therefore to study a variety of conditions with a view to accurately determine the degree of acidosis ($CO_2$ combining power of the blood plasma—Van Slyke, or $CO_2$ tension of the alveolar air—Mariott). If this is done it will not be long before authoritative statements can be made determining positively whether insulin has an added place in this field or not.

E. L. T.

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## The Registered Nurse

The professions of nursing and medicine have ever been and must of necessity continue to be closely associated. The medical profession has shown a deep interest in the comparatively new profession of nursing and has helped in its development. This has been to the advantage of both professions, for what physician or surgeon is not greatly dependent on the nurse, be she registered or otherwise? The physician makes a short professional visit but the nurse is in charge of the patient eight and usually more of the twenty-four hours.

It must be admitted that the nurses themselves have furnished the main impetus in the development of their profession and the law has rightly vested in them the dispensing of the title R. N. (Registered Nurse). The governor appoints a State Board of Examiners of Nurses to be composed of practicing nurses, corresponding to the State Board of Medical Examiners and with corresponding duties. In short, it is the duty of the Nurses' Board to determine who are qualified to practice nursing as registered nurses.

It has been perhaps inevitable that the Board has been criticised by the directors of some of the smaller hospitals. There has been the feeling vigorously expressed at one of our recent sectional medical meetings, that the Board in its recommendations has been discriminating in favor of the larger hospitals with the definite purpose of eliminating the small hospital. There must be some limit to the size of a hospital capable of turning out a well trained nurse and we do not consider the minimum established by the Board of a hospital averaging twenty-five patients to be unreasonable. Certain minimal requirements too in the curriculum of the training school are absolutely essential.

The small hospital, on the other hand, cannot be eliminated by the Board as long as the latter has no jurisdiction over the licensing of hospitals. Naturally, small hospitals experience some difficulty in obtaining prospective nurses if their nurses' training school is not accredited—that is, their graduates are not eligible for examinations for the title of R. N. In this regard, grave injustice has often been done the trainee, who is given to understand that the hospital is accredited when such is not the case. So that the smaller hospitals may not be at a disadvantage, affiliation with other designated hospitals is frequently effected.

The first bill presented by the nurses at the last legislature aroused vigorous opposition. What the committee of nurses desired primarily was an elevation of entrance requirements to a four year high school training. Minnesota has been and still is one of the five states in the Union having a low preliminary requirement of grammar school education, the other four being southern states. This fact in itself is significant.

The standing of the entire nursing profession suffers necessarily as a result of the low preliminary requirements and it does not of necessity follow that a raising of these requirements would aggravate the present dearth in applicants for training. High school girls and those with one or more years of college training will not train with grammar school graduates. This low preliminary requirement and the dearth of applicants for train-

ing during the past few years has created a tendency on the part of the schools to accept anybody. Perhaps this situation accounts in part for some of the criticism directed of late at the nursing profession. They are charged with a tendency towards commercialism. In this regard it does not behoove members of the medical profession to throw a stone. When it is generally appreciated that the average nurse in Minnesota does not work more than nine months in the year because of the seasonal prevalence of sickness and that the average income is in the neighborhood of $1,000.00 a year—barely a living wage—it will be realized that the nursing profession is no place for the young woman with commercial instincts. What a nurse furnishes is not measurable in coin and is admittedly poorly paid. It is truly a noble profession and not a trade and the young woman looking for a gainful occupation should go elsewhere. We do believe that the tendency on the part of trained nurses to furnish less for their fee by reducing the number of hours on duty and being too particular as to the kind of duties she will perform is a departure from the highest conception of the trained nurse and is a great mistake. Better to demand a higher fee than to furnish less service.

Opposition to the bill as first proposed centered on the clause requiring approval of training schools by the Board. This was felt to be an infringement of the rights of the smaller hospitals.

The modified bill which became law instituted five changes: (1) the Board is to consist of five nurses instead of four nurses and one physician; (2) there is to be an Educational Director supported by (3) a registration fee of $15.00 instead of $5.00; (4) examinations are to be held in various parts of the state; (5) reciprocity between states is to be based on individual qualifications independent of state requirements.

We do not feel that there will ever be any danger of a trained nurse being overtrained in the matter of nursing. There is room for some argument as to just how much medical knowledge should be included in the nurses' curriculum. We still contend that there is a demand for a nurse less highly trained than the trained nurse but with more training than the so-called practical nurse and that recognition of this fact would be to the benefit of the nursing and medical professions and, what is more important, to the public.

# OBITUARY

## DR. E. W. BUCKLEY

Dr. Edward W. Buckley, of St. Paul, died Wednesday, September 26, at St. Joseph's Hospital, St. Paul, at the age of 63 years. Dr. Buckley had been in failing health for the past year although still attending to his duties as a physician.

Dr. Buckley was born in 1860 on a farm in Ramsey county near White Bear, Minn. His youth was spent in Minnesota and with the exception of the years in college and university and two years immediately following, his entire life was passed in Minnesota. He was graduated from the high school at Mankato and then attended Holy Cross college in Massachusetts. He took his medical course and received his medical degree at Columbia University. Upon completion of his internship at Bellevue Hospital, Dr. Buckley came to St. Paul, where he began the practice of medicine.

Dr. Buckley was prominent as being one of two Legion of Honor men in St. Paul, having received his decoration from Marshal Foch for his distinguished work with the Knights of Columbus overseas. He was a former chief of staff of St. Joseph's Hospital, St. Paul, and past president of the Ramsey County Medical Society.

Dr. Buckley is survived by his widow, a daughter, Margaret, and a sister, Mrs. John Dougherty, of Mankato.

## DR. CHARLES MONROE CANNON

Dr. Charles Monroe Cannon died suddenly Wednesday, October 17, at his home in St. Paul, at the age of 61 years.

Dr. Cannon was a member of the state board of medical examiners from 1902 to 1905. He specialized in surgery and had practiced in St. Paul since 1892.

Dr. Cannon was graduated from the Bennett Medical college in Chicago in 1888. The next two years were spent in Alden, Minn. Dr. Cannon then moved to White Earth, where he was United States surgeon for a year.

Born on a farm near Madison, Wis., in 1861, he attended the public schools at Cherokee, Iowa, and was a graduate of Drake university, at Des Moines. He was married July 3, 1888, to Miss Edith M. Morey, of Albert Lea, Minn.

Dr. Cannon was a member of the American Medical Association, the State Medical Association and various other fraternal organizations. He was past grand medical examiner of the Ancient Order of United Workmen.

The widow, two daughters, Mrs. Florence M. Barnard and Mrs. Blossom I. Kirkwood, his mother and brothers and sisters survive.

## DR. SHERMAN RIPPERTON

Dr. Sherman Ripperton, of Wyndmere, N. D., formerly a practicing physician in Minnesota, died Monday, September 17, at the hospital in Lidgerwood, following a lingering illness of several months. Dr. Ripperton was 57 years of age at the time of his death.

# REPORTS AND ANNOUNCEMENTS OF SOCIETIES

## AMERICAN ASSOCIATION FOR THE STUDY AND CURE OF CANCER

On October 12th there was organized in the New York Academy of Medicine "The American Association for the Study and Cure of Cancer." There were over 60 enrolled from eighteen different states of the union and some from outside countries, as charter members.

Dr. L. Duncan Bulkley, New York City, was elected president; Dr. Curtis Frank Claassen of Brooklyn, vice-president; Dr. A. Hirst Appel, colonel in the Medical Corps, U. S. (retired), secretary and treasurer; with an executive committee of five.

The next annual meeting will be held in Chicago, in May, during the meeting of the American Medical Association.

## NICOLLET-LE SUEUR COUNTY MEDICAL SOCIETY

The Nicollet-Le Sueur County Medical Society held its annual meeting September 25, 1923, at the Nicollet Hotel, St. Peter. The principal paper on the program, "Fractures and Dislocations of the Femur," was read by Dr. J. M. Fisher of St. Peter, and was followed by a general discussion.

The Committee on Goiter Prevention, composed of Dr. J. W. Daniels, Dr. R. M. Phelps and Dr. H. A. Hartung, gave the following report of their activities:

The Nicollet-Le Sueur County Medical Society, having the matter of goiter prevention under consideration, extended an invitation to Dr. Talliaferro Clark of the U. S. P. H. Service, Washington, D. C., to visit the state for the purpose of making a survey of the goiter situation. Dr. Clark, in company with Dr. J. N. Gililan of the Minnesota State Board of Health, made the following report at the annual meeting of the society. The survey comprises a report of goiter conditions among children in the sixth grade up through the high school.

Number of children examined—Girls.....188
Boys.....121

309

Cases of thyroid enlargement.....111 or 35.9%
Of the girls 95 (or 50.5%) had enlargement
Of the boys 16 (or 13.2%) had enlargement
Of the 95 girls with thyroid enlargement—
40 (or 42.1%) were very slightly enlarged
43 (or 45.2%) were slightly enlarged
12 (or 12.7%) were moderately enlarged
Of the 16 boys with thyroid enlargement—
11 (or 68.7%) were very slightly enlarged
5 (or 31.3%) were slightly enlarged
None were moderately enlarged

## MINNEAPOLIS SURGICAL SOCIETY MONTHLY CLINIC DAY

THURSDAY, Nov. 8, 1923

Abbott Hospital, 8:00 to 10:00 A. M.—Operative Clinics: Drs. Abbott, Strachauer, Johnson.

Northwestern Hospital, 10:00 A. M. to 12:00 M.—Operative Clinics: Drs. Law, Mann, Poppe, Bulkley, Yoerg, Nordland.

Anatomy Building, 2:00 to 4:00 P. M.—Surgical Pathological Conference: Drs. E. T. Bell, Cameron, McCartney, Clawson, O'Brien.

6:30 to 8:00 P. M.—Dinner at Elks Club.

8:00 P. M.—Minneapolis General Hospital Clinic Room. Presentation of Clinical Cases and a paper by Dr. S. H. Baxter, "Retroperitoneal Tumors."

For further information address Dr. A. A. Zierold, Sec., 516 La Salle Bldg., Minneapolis, Minn.

## WRIGHT COUNTY MEDICAL SOCIETY

The annual meeting of the Wright County Medical Society was held at Buffalo, Tuesday afternoon, October 2, 1923.

Officers elected for the ensuing year were: President, Dr. C. L. Roholt, Waverly; vice president, Dr. O. J. R. Freed, Cokato; secretary-treasurer, Dr. J. J. Catlin, Buffalo. Dr. A. E. Phillips, of Delano, was elected to act as delegate to the state convention with Dr. A. G. Moffatt, of Howard Lake, as alternate.

"The Report of a Case of Extra Uterine Pregnancy at Full Term" was given by Dr. J. J. Catlin. Dr. E. E. Shrader, of Watertown, presented a paper on "Endocarditis."

Following the business session a banquet was given for the members and visiting ladies.

## GOODHUE COUNTY MEDICAL SOCIETY

At the annual meeting of the Goodhue County Medical Society held at Red Wing in September, the following officers were elected: President, Dr. A. M. Aanes, Red Wing; vice president, Dr. L. B. Gausemal, Goodhue; secretary-treasurer, Dr. M. W. Smith, Red Wing. Drs. A. W. Jones, A. E. Johnson and H. P. Sawyer, all of Red Wing, were chosen to compose the board of censors of the society.

# OF GENERAL INTEREST

Dr. Charles I. Spannare, of Milton, N. D., has located at Round Lake, Minn.

Dr. J. A. Regner, formerly of St. Hilaire, is now practicing medicine at Middle River.

Dr. Victor C. Thompson, formerly of Stillwater, is now located at Marine-on-St. Croix.

Dr. Edward J. Brown, of Minneapolis, who recently underwent an operation at Eitel Hospital, is reported as recovering safely.

Dr. Richard N. Jones formerly of Gaylord is now located at Richmond, where he is a member of the staff of the Richmond Hospital.

Dr. French K. Hansel, formerly of the Mayo Clinic, Rochester, has located in St. Louis, Missouri, where he will establish a practice.

Dr. R. V. Williams, of Rushford, together with Mrs. Williams, recently returned from a trip through the Dakotas, Iowa and Illinois.

Dr. L. W. Satterlee, who has been practicing medicine at Pequot for the past six months, has returned to his former location at Parker's Prairie.

Dr. Clayton F. Andrews, formerly of the Mayo Clinic, Rochester, is now located at Lincoln, Nebraska, where he is engaged in the practice of medicine.

Dr. Gordon S. Foulds, formerly of the Mayo Clinic, Rochester, is now practicing his profession at 151 Bloor Street West, Toronto, Ontario, Canada.

Dr. J. L. Lee, formerly of Wahpeton, N. D., has disposed of his practice there and has established offices at Watertown, Minn., for the practice of medicine.

Dr. I. S. Benson, formerly a member of the Union clinic, Willmar, has moved to Montevideo, where he is a member of the surgical staff of the Community Hospital.

Dr. A. J. Chesley, executive officer of the State Board of Health, has returned from Boston, where he attended the meeting of the American Public Health Association.

Dr. O. N. Meland, of Warren, and Miss Mildred Langtry, of Minneapolis, were married at Brooklyn, N. Y., in September, just prior to sailing for Europe, where Dr. Meland is engaged in further pursuance of his studies in surgery.

The marriage of Miss Ruth Martin, of Saint Paul, to Dr. W. F. Widen, of Minneapolis, was solemnized at the Winifred Street Evangelical church, St. Paul, September 8. Dr. and Mrs. Widen are now at home in Minneapolis.

Announcement has been received of the marriage of Dr. Walfred Johnson, of Stillwater, to Miss Sophie Koelzer, of Jordan, which took place at Jordan, October 1. Dr. and Mrs. Johnson are now at home in Stillwater.

Dr. F. P. Frisch has disposed of his practice at Gibbon and is now located at Richmond. Announcement was recently received of the marriage of Dr. Frisch to Miss Palma Nelson, of Fairfax, which took place August 30.

Dr. and Mrs. W. H. Daniels and son, Harrison, of Crookston, recently returned from a motor and camping trip through the northern part of the state in the Superior National Forest.

Dr. Egbert Borgeson, of Hanska, who has entered the state university for advance instruction in eye, ear, nose and throat work, has disposed of his practice at Hanska to Dr. J. O. Pederson, formerly of Minneapolis.

Dr. F. W. Davis, who has been a practicing physician at Decorah, Iowa, for some time, has located at Adams, Minnesota, where he has established an office for the practice of medicine.

Dr. F. E. Harrington, health commissioner of Minneapolis, was elected head of the executive council of the American Public Health Association at its convention held in Boston last month.

Dr. Reuben A. Johnson, who was formerly associated with Dr. George Douglas Head, Minneapolis, has returned from a year's post-graduate work in Vienna, and has established offices at 301 Physicians and Surgeons Bldg., Minneapolis, for the practice of medicine.

The annual 1923 roll call of the American National Red Cross will be held from Armistice Day to Thanksgiving, November 11 to 29. This roll call is the only appeal which the Red Cross makes during the year and furnishes the means by which they carry on their fine work.

Dr. A. A. Zierold, of Minneapolis, read a paper on "Primary Peritonitis" at a meeting of the Minnesota Pathological Society held at the Institute of Anatomy building, University of Minnesota, October 16. Dr. W. A. O'Brien also gave a paper on "Acute Emphysema in Infancy," which was discussed by Dr. Rood Taylor and Dr. Clemens Pirquet.

Dr. John C. Staley, who has been superintendent of Ancker Hospital, St. Paul, since the demise of Dr. Ancker the first part of the year, has resigned his position owing to failure to recover completely from an injury received in an automobile accident which occurred a year ago. Dr. J. L. McElroy, former assistant superintendent, has been appointed to succeed Dr. Staley; Dr. F. G. Carter is assistant superintendent on a part time basis and is continuing his private practice with offices at 632 Lowry Building.

The remarkable reduction in the death rate from tuberculosis which has taken place in the last 20 years is probably due to a number of reasons. It is significant that as soon as the etiological factor in a disease has been discovered progress is made in the control of that disease. The death rate from tuberculosis since the formation of the National Tuberculosis Association in 1904 has been so reduced that it is estimated that lives of 100,000 persons in this country have been spared during the past year. This splendid work can be continued if the public continues to support the work by the purchase of Christmas seals.

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## Minnesota State Board of Health Items

The activities of the Division of Venereal Diseases of the State Board of Health during September include the distribution of 1,851 pamphlets on various phases of sex education, applications for which were received at the State Fair booth. Wassermann tests totaled 962, of which 771 were for private patients, the balance for institutional patients. Of the venereal cases reported to the department, 552 were single, 299 married, and 54 widowed. The source of infection was as follows: commercial prostitutes, 190; clandestine prostitutes, 261; unknown, 450; spouse, 23; congenital, 15; and accidental, 4. The social service department handled 390 cases, 208 being old cases. The Wassermann reactions totaled 2,406 with 17.2 per cent positive.

Dr. Ruth Boynton, instructor in the department of preventive medicine, University of Minnesota, has been chosen to succeed Dr. E. C. Hartley as director of child hygiene, Minnesota State Board of Health. Dr. Hartley left for Berlin, Germany, October 15, to study medicine under Dr. Robert Meyer.

# NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

ABBOTT LABORATORIES:
- Argyn Tablets.

AMERICAN RADIUM APPLIANCE CO.:
- Hydro Radium Activator.

PARKE, DAVIS & CO.:
- Tablets Tuberculin B. E.-P. D. & Co.
- Tablets Tuberculin T. R.-P. D. & Co.
- Malt Extract (Unmedicated)-P. D. & Co.
- Malt Extract with Cod Liver Oil-P. D. & Co.
- Tobacco Protein Extract Diagnostic-P. D. & Co.
- Goldenrod Pollen Protein Extract Diagnostic-P. D. & Co.
- Sal Ethyl Capsules, 5 minims.

E. R. SQUIBB & SONS:
- Ampules Pituitary Solution-Squibb, 0.5 c.c.
- Ampules Pituitary Solution-Squibb, 1 c.c.
- Pollen Allergen Solution Timothy-Squibb.
- Pollen Allergen Solution Ragweed-Squibb.

SWAN-MEYERS CO.:
- Ragweed Pollen Extract-Swan-Meyers.

WILSON LABORATORIES:
- Tablets Ovarian Substance-Wilson, 2 gr.
- Tablets Ovarian Substance-Wilson, 5 gr.
- Capsules Ovarian Substance-Wilson, 2 gr.
- Capsules Ovarian Substance-Wilson, 5 gr.
- Tablets Ovarian Residue-Wilson, 2 gr.
- Tablets Ovarian Residue-Wilson, 5 gr.
- Capsules Ovarian Residue-Wilson, 5 gr.

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*Arsphenamine-Squibb, 1 gm. Tubes.*—Each contains 1 gm. arsphenamine-Squibb (see New and Non-official Remedies, 1923, p. 49). E. R. Squibb & Sons, New York.

*Arsphenamine-Squibb, 1.2 gm. Tubes.*—Each contains 1.2 gm. arsphenamine-Squibb (see New and Non-official Remedies, 1923, p. 49). E. R. Squibb & Sons, New York.

*Ampules Pituitary Solution-Squibb, 0.5 c.c.*—Each contains 0.5 c.c. pituitary solution-Squibb (formerly marketed as solution of hypophysis-Squibb (see New and Non-official Remedies, 1923, p. 219). E. R. Squibb & Sons, New York.

*Ampules Pituitary Solution-Squibb, 1 c.c.*—Each contains 1 c.c. pituitary solution-Squibb (formerly marketed as solution of hypophysis-Squibb (see New and Non-official Remedies, 1923, p. 219). E. R. Squibb & Sons, New York.

*Enteric Coated Tablets Neutral Acriflavine-"National," 0.0324 gm. (1/2 grain).*—Each tablet contains 0.0324 Neutral Acriflavine-"National" (see New and Non-official Remedies, 1923, p. 25). National Aniline & Chem. Co., New York.

*Ointment Neutral Acriflavine-"National."*—Neutral acriflavine-"National" (see New and Non-official Remedies, 1923, p. 25) 1 per cent dissolved in glycerin, 8 parts, and incorporated with a base composed of hydrous wool fat and petrolatum to make 100 parts. National Aniline and Chemical Co., New York.

*Pollen Protein Allergens-Squibb.*—In addition to the Pollen Protein Allergens-Squibb listed in New and Non-official Remedies, 1923, p. 241, the following have been accepted: Apple Pollen Allergen-Squibb; Black Walnut Pollen Allergen-Squibb; Cherry Pollen Allergen-Squibb; Dandelion Pollen Allergen-Squibb. E. R. Squibb & Sons, New York.

*Group Allergens Diagnostic-Squibb.*—In addition to the Group Allergens Diagnostic-Squibb listed in The Journal, August 4, 1923, p. 393, the following has been accepted: Group Allergens-Squibb Type XXIII (Ash, Cherry, Maple, Oak, Poplar, Willow). E. R. Squibb & Sons, New York (Jour. A. M. R., Sept. 1, 1923, p. 749).

*Protein Extracts Diagnostic-P. D. & Co.*—In addition to the Protein Extracts Diagnostic-P. D. & Co. listed in The Journal, August 11, 1923, p. 477, the following have been accepted: Goldenrod Pollen Protein Extract Diagnostic-P. D. & Co. and Tobacco Protein Extract Diagnostic-P. D. & Co. Parke, Davis & Co., Detroit.

*Thromboplastin-Lederle.*—An extract of cattle brain in physiological solution of sodium chlorid prepared according to the method of Hess. For a discussion of the actions, uses and dosage of brain extract see New and Non-official Remedies, 1923, p. 129, under Fibrin Ferment and Thromboplastic Substances. Thromboplastin-Lederle is marketed in 20 c.c. vials which bear an expiration date. Lederle Antitoxin Laboratories, New York (Jour. A. M. A., Sept. 15, 1923, p. 929).

*Pollen Allergen Solutions-Squibb.*—Solutions containing the sodium chlorid soluble proteins from isolated pollens of various species of plants. For a discussion of the actions, uses and dosage, see Pollen and Epidermal Extract Preparations and Biologically Reactive Food Proteins, New and Non-official Remedies, 1923, p. 234. Pollen allergen solutions-Squibb are intended for the prophylaxis and treatment of hay fever. They are marketed in the following forms: Set A, ten vials containing ten consecutive doses (Nos. 1 to 10); Set B, five vials containing five consecutive doses (Nos. 1 to 5); Set C, five vials containing five consecutive doses (Nos. 6 to 10); Set D, five vials of dose No. 10; Set E, five vials of dose No. 11. The following products have been accepted: Timothy Pollen Allergen Solution-Squibb and Ragweed Pollen Allergen Solution-Squibb. E. R. Squibb & Sons, New York.

*Ragweed Pollen Extract-Swan-Meyers.*—A liquid obtained by extracting the dried pollen of ragweed with a liquid consisting of 67 per cent glycerin and 33 per cent saturated solution of sodium chlorid. For a discussion of the actions, uses and dosage, see Pollen and Epidermal Extract Preparations and Biologically Reactive Food Proteins, New and Non-official Remedies, 1923, p. 234. The product is marketed in the following forms: Series 1, five vials containing five consecutive doses (Nos. 1 to 5); Series 2, five vials containing five consecutive doses (Nos. 6 to 10); Series 3, five vials containing five consecutive doses (Nos. 11 to 15); Complete Series, fifteen vials containing fifteen consecutive doses (Nos. 1 to 15). Swan-Meyers Co., Indianapolis.

*Luminal Tablets, 1/2 grain.*—Each contains 1/2 grain luminal (see New and Non-official Remedies, 1923, p. 63). Winthrop Chemical Company, New York.

*Malt Extract (Unmedicated)-P. D. & Co.*—A preparation essentially similar to extract of malt, U. S. P. (see New and Non-official Remedies, 1923, p. 177), but containing 10 per cent of glycerin. One gm. of the extract converts 5 to

7 gm. of starch to maltose and dextrin in thirty minutes at 40° C. Parke, Davis & Co., Detroit.

*Malt Extract with Cod Liver Oil-P. D. & Co.*—Each 100 c.c. contains Norwegian cod liver oil, 25 c.c., and malt extract (unmedicated)-P. D. & Co., 75 c.c. Parke, Davis & Co., Detroit.

*Argyn Tablets, 6 grains.*—Each tablet contains 6 grains argyn (see New and Non-official Remedies, 1923, p. 330). Abbott Laboratories, Chicago.

*Tablets Ovarian Substance-Wilson, 2 grains.*—Each tablet contains 2 grains ovarian substance-Wilson (see New and Non-official Remedies, 1923, p. 212). Wilson Laboratories, Chicago.

*Tablets Ovarian Substance-Wilson, 5 grains.*—Each tablet contains 5 grains ovarian substance-Wilson (see New and Non-official Remedies, 1923, p. 212). Wilson Laboratories, Chicago.

*Capsules Ovarian Substance-Wilson, 2 grains.*—Each capsule contains 2 grains ovarian substance-Wilson (see New and Non-official Remedies, 1923, p. 212). Wilson Laboratories, Chicago.

*Capsules Ovarian Substance-Wilson, 5 grains.*—Each capsule contains 5 grains ovarian substance-Wilson (see New and Non-official Remedies, 1923, p. 212). Wilson Laboratories, Chicago.

*Tablets Ovarian Residue-Wilson, 2 grains.*—Each tablet contains 2 grains ovarian residue-Wilson (see New and Non-official Remedies, 1923, p. 212). Wilson Laboratories, Chicago.

*Tablets Ovarian Residue-Wilson, 5 grains.*—Each tablet contains 5 grains ovarian residue-Wilson (see New and Non-official Remedies, 1923, p. 212). Wilson Laboratories, Chicago.

*Capsules Ovarian Residue-Wilson, 5 grains.*—Each capsule contains 5 grains Ovarian Residue-Wilson (see New and Non-official Remedies, 1923, p. 212). Wilson Laboratories, Chicago (Jour. A. M. A., Sept. 29, 1923, p. 1113).

## PROPAGANDA FOR REFORM

*Administration of Insulin.*—The present methods of administering insulin parenterally are far from satisfactory. Consequently, the earliest investigators of insulin and other pancreatic preparations attempted to secure physiologic effects by oral administration. There is evidence that slight effects may be obtained when insulin or other pancreatic preparations are introduced into the organism by way of the mouth under certain conditions. On the whole, however, the oral administration of insulin has proven quite inefficient. Rectal administration and nasal insufflation have been tried without success. A recent study showed that pancreatic extracts taken in capsule form by the stomach was not effective in decreasing blood sugar or urinary sugar. It is desirable to give wide publicity to the current limitations of a most promising therapy, since unscrupulous venders are already attempting to distribute just-as-good pancreatic or antidiabetic preparations that are recommended for oral use (Jour. A. M. A., Sept. 1, 1923, p. 752).

*El Zair.*—This is quackery's latest offer of an elixir of life. The nostrum is brought to the attention of the public by El Zair, Inc., New York. The firm claims that the elixir of youth has at last been found. Much is made of the endorsement which the late W. T. Stead is stated to have given the nostrum. El Zair is to be dissolved in water and applied by sponging the body with it daily. The A. M. A. Chemical Laboratory analyzed El Zair and reported that essentially it may be considered to consist of one part of glacial acetic acid and three parts of magnesium sulphate (Epsom salt) perfumed with oil of bergamot. The contents of a bottle of El Zair are to be dissolved in a pint of water and, therefore, an essentially similar solution can be made by dissolving 2½ ounces of Epsom salt in a pint of distilled vinegar (Jour. A. M. A., Sept. 1, 1923, p. 768).

*Lactic Acid-Producing Organisms and Preparations.*—The Council on Pharmacy and Chemistry reports on the present status of sour milk therapy. During recent years reports have been published which indicate that the growth in the intestine of the normally present Bacillus acidophilus may be increased so as to make this the predominating organism, by the administration of lactose, by milk fermented with Bacillus acidophilus, or by the administration of viable cultures of Bacillus acidophilus in conjunction with lactose. Growing out of the claims of favorable therapeutic action, the use of so-called Bacillus acidophilus milk and other products prepared with B. acidophilus has become quite widespread. While no one subscribes today to the original theories of Metchnikoff, there are many who believe that the regulation of the bacterial flora is of importance. There is evidence that the administration of sour milk is at times beneficial, particularly in pediatrics. A wide clinical observation indicates that for certain types of gastric and intestinal disturbances, fermented milk accomplishes more than unfermented milk (Jour. A. M. A., Sept. 8, 1923, p. 831).

*Calcium Chlorid in Hay Fever.*—Calcium chlorid seems to be of some use in the treatment of hay fever, but it must be taken in rather large doses during the whole season to be of much benefit—about 1 gm., from four to six times a day. The use of this drug in hay fever is chiefly based on the work of European investigators who have shown that the permeability of the mucous membranes and of the capillaries is decreased by the internal application of calcium chlorid. The treatment is entirely symptomatic, and no permanent relief must be expected (Jour. A. M. A., Sept. 8, 1923, p. 850).

*Accidents with Local Anesthetics.*—The chairman of the committee for the study of toxic effects of local anesthetics, appointed by the Therapeutic Research Committee of the Council on Pharmacy and Chemistry, publishes a preliminary report. The committee has received reports of forty-two deaths following the use of local anesthetics occurring within the last few years. These accidents have not been reported on by former committees of the association. The deaths reported are:

| Anesthetic | Number |
|---|---|
| Stovain | 1 |
| Alypin | 1 |
| Procain | 3 |
| Apothesin | 4 |
| Butyn | 4 |
| Butyn and cocain | 1 |
| Procain and cocain | 10 |
| Cocain | 18 |
| Total | 42 |

Under the headings Procain, and Procain and Cocain, novocain is included: one is reported as procain and the other twelve as novocain. As the five deaths following the use of butyn are the first reported, the committee is very desirous of receiving full details of other fatalities for comparison of relative toxicity. These reports should be sent to the chairman of the committee, Emil Mayer, M.D., 40 East Forty-first Street, New York City (Jour. A. M. A., Sept. 15, 1923, p. 947).

*Some More Miscellaneous Nostrums.*—The following products have been the subject of prosecution by the federal authorities charged with the enforcement of the Food and Drugs Act: Cowan's Rheumatism Herb (Rheumatism Herb Co.), consisting of dried and moldy leaves of a species of eucalyptus. Jad Salts (Wyeth Chemical Co., Detroit, not John Wyeth Bros., Philadelphia), consisting essentially of citric and tartaric acids, salt, baking soda, sodium phosphate and very small amounts of hexamethylenamin, lithium carbonate and potassium bicarbonate. Crane's Quinin and Tar Compound (Crane Medicine Co.), consisting essentially of quinin, sodium salicylate, ammonium chlorid, Epsom salt, oil of anise, tar, menthol, table salt, calcium phosphate, sugar, alcohol and water. Crane's Liver Pills (Crane Medicine Co.), consisting essentially of aloes and magnesium carbonate. Crane's Kidney Pills (Crane Medicine Co.), containing methylene blue, hexamethylenamin, plant extractive and iron sulphate. Tekol (Colonial Tablet Co.), containing ground celery seed and cocoa with about a half grain of caffein in each tablet. Veronica Water (Veronica Medicinal Springs Water Co.), containing magnesium sulphate (Epsom salt), sodium nitrate, sodium chlorid (common salt), calcium bicarbonate, calcium sulphate and magnesium chlorid (Jour. A. M. A., Sept. 15, 1923, p. 946).

*So-called "Improved" Ethers.*—In 1919 Cotton declared that ethyl ether specially purified was not a good anesthetic, and that real anesthesia could not be obtained unless ether contained some potent synergist. He proposed the use of Cotton Process Ether, which was stated to be ether containing ethylene, carbon dioxid and ethyl alcohol. The manufacturer submitted Cotton Process Ether to the Council on Pharmacy and Chemistry, but, so far, confirmation of Cotton's claims is lacking. Wallis and Hewer, of England, have also recommended a new general anesthetic with the claim that pure ether possesses practically no anesthetic properties, and that their product contains a mixture, in unspecified amounts, of ketones (identified only in vague terms) which have been treated previously with carbon dioxid and ethylene. This product has been placed on the market as "Ethanesal." It has received some endorsement, especially from Dr. H. E. G. Boyle, of London, who made it the subject of addresses on anesthesia in this country. In contradiction of the claims made for Cotton Process Ether and "Ethanesal," Bourne and Stehle showed that ether prepared in a way to exclude impurities possesses the usual anesthetic properties. A painstaking investigation recently reported by Dale, Hadfield and King confirms the generally accepted belief that the anesthetic action of ether is due to the ether itself. They also report their examination of "Ethanesal." They found "Ethanesal" to contain 95.5 per cent ether, 4 per cent normal butyl alcohol, and 0.5 per cent of a mixture of ethyl alcohol and an aldehyd and possibly traces of other substances. The investigation shows that there is no evidence to warrant attributing the anesthetic action of "Ethanesal" to any other constituent than the ether. On the contrary, the work shows that the anesthetic action of ether is improved by purification (Jour. A. M. A., Sept. 22, 1923, p. 1040).

*Ethanesal.*—In 1921 Dr. H. E. G. Boyle, of London, read a paper before the Section on Miscellaneous Topics at the annual meeting of the American Medical Association. The paper dealt, in part, with so-called improved ether—"Ethanesal." The paper was not published in The Journal A. M. A. on the ground that The Journal does not publish articles on new remedies until those products have been reported on favorably by the Council on Pharmacy and Chemistry. The investigation of "Ethanesal" by Dale, Hadfield and King which makes plain the fallacy of the claims for the product, demonstrates again the advantage to the medical profession of a competent judicial body—the Council on Pharmacy and Chemistry—to investigate new additions to our materia medica (Jour. A. M. A., Sept. 22, 1923, p. 1025).

*The Nature of Insulin.*—The manufacture of insulin from the pancreas is a costly and laborious undertaking. Therefore, the artificial synthesis is important. Before the prospect of a synthesis can be entertained, however, the chemical structure must be ascertained. Evidence is developing that insulin is protein in nature. Consequently the hope of its isolation as a chemically pure substance becomes slender (Jour. A. M. A., Sept. 29, 1923, p. 1117).

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# PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

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Meeting of May 9, 1923

Dr. H. Longstreet Taylor, Presiding

Dr. Theodore Bratrud, Warren, gave the following cases:

Case 1. G. C., aged 35, was kicked over the right upper abdomen by a horse at 7 A.M. before having breakfast. He vomited blood twice. Dr. Blegen saw the patient about two hours afterward and had him brought to the hospital. At 11 o'clock the patient showed evidences of shock. He was pale, his hands were cold and his abdomen rigid. Costal breathing. On auscultation of abdomen, no peristaltic waves could be heard. Systolic blood pressure was 120 and diastolic 75. Pulse 80. Mucous membrane was pale. He was very tender over the liver.

A diagnosis of hemorrhage from rupture of the liver was made.

On opening the abdomen, no free blood was found in the abdomen. A slight amount of blood-tinged serum was noted. The transverse mesocolon presented a peculiar appearance. It was very much thickened and red. On introducing the hand into the abdomen a soft mass was felt over the region of the right kidney, which was first thought to be a crushed kidney with a hematoma. On further examination the kidney was identified below the mass. The upper leaf of the transverse meso-colon was opened

and clotted blood was removed, showing the pancreas exposed, and three bleeding points were found actively bleeding in the angle between the pancreas and the third portion of the duodenum. These were ligated. The patient was given hypodermoclysis. He reacted nicely and made an uninterrupted recovery.

CASE 2. F. G., aged 31, came to Warren Hospital at 2 P.M. on August 3, 1922, with history as follows:

Pleurisy three years ago, from which he made a good recovery. At noon, he was kicked in the abdomen by a horse. He fell down but did not lose consciousness. In half an hour he began to feel cramps which increased in severity. He did not vomit but felt dizzy. Was seen at Warren Hospital at 2 P.M. and at that time he was pale and was suffering a great deal of pain, paroxysmal in character. His extremities were cold and the abdomen rigid. There was tenderness over the whole abdomen and left loin. Blood pressure 108/60. He was given ¼ gr. of morphin and atropin. He passed four ounces of very dark colored urine containing clots.

Patient was taken to the operating room at once. A Kocher kidney incision revealed a kidney split transversely into two parts completely and fissured otherwise. About one pint of blood had formed around the kidney. The kidney remains were removed and hemorrhage controlled. The peritoneum was incised at the anterior end of the kidney incision, and blood clot was found in the peritoneal cavity. The spleen was found split in three pieces. All vessels were ligated and the lacerated spleen removed. The patient was given 500 c.c. of glucose solution intravenously on the operating table. Blood pressure after operation was 120. Patient made an uninterrupted recovery.

On September 7, five weeks after the injury, his hemoglobin was 88, r.b.c. 4,250,000; leucocytes 14,900; small lymphocytes 25, large lymphocytes 23, and eosinophiles 2½.

On April 27, 1923, his white count was 8,500, polynuclears 73, small lymphocytes 17, large lymphocytes 7, and eosinophiles 1.

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DR. W. F. BRAASCH, Rochester, reported the following case:

L. H., age 39, married; occupation, pressman. Family and marital history essentially negative. Typhoid fever in 1905; pneumonia in 1918.

Chief complaint—pain in left upper abdomen. General health always good. In last five or six years had complained of pain referred to left upper abdomen which radiated into loin. Pains have become gradually more frequent, so that during the past year they occur almost daily. No accompanying urinary symptoms, no downward radiation. Pain accompanied by nausea and vomiting when severe. Patient has seen ten different physicians in the last two years, with that many different methods of treatment, and without avail.

First examination in October, 1922. Weight normal—150 pounds; blood pressure 120/72. Physical examination negative.

Urinalysis: amount 1,000 c.c., specific gravity 1018, acid reaction, albumin 2, sugar 0, pus cells varying from 2 to 30 cells to a field, occasional red blood cell. Two-hour phthalein 50 per cent.

Tonsils small with some fluid pus.

*X*-ray of colon and chest negative. *X*-ray of urinary tract showed a shadow 1 cm. in diameter in left kidney area.

Cystoscopic examination showed bladder to be normal. Negative urine catheterized from both kidneys. Differential phthalein test showed appearance in four minutes from both kidneys, 15 per cent from left, 15 per cent from right, in fifteen minutes. Pyelogram showed a normal pelvis and ureter, save for the fact that the upper calices seemed to be obliterated. Original shadow was apparently outside of kidney, since it was lateral to upper calices.

Diagnosis: Neuromuscular pains. Shadow in left renal area probably extrarenal. Tonsillectomy advised, which was done. Patient returned to his home.

Patient returned April, 1923, with a history of continued pain in upper left abdomen and loin. Since the last visit pain has become more frequent and more severe. A cough or sudden jar seems to start the pain. A week before coming he had a severe chill together with fever. He noted that the urine contained sediment.

Urinalysis now is much the same as before, only the urine contains a large amount of pus, which was stained for tubercle bacilli, but found negative.

*X*-ray shadow remains as before. In the roentgenogram now taken the shadow remains much the same.

On cystoscopic examination there was a slight cystitis. Urine catheterized from left kidney showed much pus. In spite of this the function of the kidney remained practically normal.

Diagnosis now: Cortical stone (?), with pyelonephritis. Operation was advised.

At operation, a cystic mass about the size of a small orange, involving the upper third of the kidney, was found. Remaining two-thirds of the kidney appeared normal. On section an encapsulated cyst was found, containing about two ounces of greenish pus, in the center of which lay the stone. It was surrounded by a capsule of inflammatory tissue about 1 cm. in thickness. Did not appear to be any gross connection with the pelvis, which was slightly thicker than normal. Cyst could best be explained by a calyx which became blocked by the stone with resulting dilatation, subsequent encapsulation and infection.

The kidney was removed and the specimen is here for your inspection.

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DR. ARTHUR N. COLLINS, Duluth, gave the following case report:

I desire to report the case of a man of 59, a native American, carpenter by occupation, who came under my observation January 12, 1923. The family history is negative except for the mother, who died at 46 of "stomach trouble," possibly cancer. The patient was always well as a child and large and strong through the rest of his life up to about three years ago. No particular complaint during the three years except that he was not so strong as usual, that he worked indoors where coal gases were in the air a good deal one year ago, and about three months previous to January 12, he noticed a hard lump in his left abdomen and this seemed to be growing larger. He is constipated,

the bowels requiring a laxative practically every day. He cannot seem to defecate unless the stools are thin. No blood in the stool. He has no pain in this region. He has had night frequency for ten or fifteen years but this has been worse lately—three or four times at night. No pain on urination; no blood. The lump he complains of is in the left flank and "pushes up" toward his ribs. He has lost some weight. His best weight was 190 at the age of 23; his average weight has been between 172 and 175. Last November the weight was 158 and in three weeks it was down to 142. At present he weighs 155.

Examination: A large man, six feet tall, large boned, large hands. Eyes gray, tongue clean except slight coat at the back; mucous membranes good color. No general adenopathy; no signs of marked or rapid loss of weight. Breath sounds seem normal and the heart is regular, rate about 72 and no murmurs or other abnormal sounds heard. In the abdomen there are no muscle spasms or tenderness and palpation is reasonably easy; in the left side of the abdomen, however, beginning above the left costal margin and extending down to the iliac crest there is dullness and this extends around into the left lumbar region. On palpation there is a hard mass in the region of dullness extending pretty well over to the midline above and sloping over laterally and downward toward the ilium. A notch can be felt indistinctly in the edge toward its upper part. No tenderness of consequence on palpation. The mass is not movable, or only slightly so. The urine is negative. Blood pressure 130/80. The blood examination showed the red count 3,040,000, the hb. 55 per cent, and the white count 345,000 on the first examination. The differential count showed polys. 39 per cent; large lymphocytes 46 per cent; myelocytes 8 per cent; basophiles 5 per cent; eosinophiles 1 per cent; 5 normoblasts and 1 megaloblast. Here we have a pretty fair anemia and a high white count with a large number of myelocytes (about 27,600). A diagnosis of splenomyelogenous leukemia was made and *x*-ray treatments ordered. The table of treatments and white counts and dates follows:

| | | | | |
|---|---|---|---|---|
| Jan. | 12..... 345,000 | | day of first examination | |
| " | 15..... 460,000 | | treatment | |
| " | 17..... 410,000 | | " | |
| " | 19..... 358,000 | | " | |
| " | 22..... 280,000 | | " | |
| " | 27..... 268,000 | no | " | |
| " | 31..... 314,000 | no | " | |
| Feb. | 5..... 272,500 | | " | |
| " | 9..... 176,000 | | " | |
| " | 15..... 159,000 | | " | |
| " | 26..... 147,000 | | " | |
| Mar. | 2..... 93,000 | no | " | |
| " | 5..... 76,000 | no | " | |
| " | 10..... 64,000 | | " | |
| " | 17..... 43,000 | no | " | R.B.C. 4,360,000 |
| Apr. | 7..... 34,000 | no | " | |

With the decrease in the white counts the size of the spleen was steadily smaller, until on April 23rd the spleen could be percussed and the edge felt at the costal border. The skin was bronzed over the area where the *x*-ray treatments had been given in spite of filtration of the rays. The hemoglobin had also risen to about 80% and the red count to 4,360,000 and he felt distinctly better and stronger.

In reading over Dr. W. J. Mayo's report in the Illinois Medical Journal of March, 1922, I learned that at Rochester they had splenectomized twenty-nine patients for splenomyelogenous leukemia after the white counts had been reduced. Seven were known to be alive and in good condition more than three years following operation; four, more than four years; and one, more than five years. The ordinary duration of this disease without surgery is from two to three years. There are acute cases which terminate more precipitately.

These conditions were thoroughly explained to this patient and after giving the matter some thought he elected to have his spleen removed. This was done April 25, 1923. The findings were not remarkable at operation and the spleen was easily removed. Fortunately he had a smooth convalescence, the wound healing per primam, and with very little, if any, gastrointestinal post-operative discomfort. He left the hospital on the fourteenth day following operation.

On the day before operation the hemoglobin was 80 per cent, the red count 4,200,000, and the white count 27,500 and the myelocytes 13 per cent. Three days after splenectomy the myelocytes were 3 per cent. Fourteen days after operation the red count was 4,400,000, the white count 38,800, and no myelocytes seen.

The spleen, which is approximately about one-third of the size before *x*-ray treatments were begun, is being passed around for your inspection.

*Discussion:* Dr. H. B. Sweetser, Minneapolis: In myelogenous leukemia, with *x*-ray or radium, you can reduce the number of white blood cells, and if you give it frequently enough you will reduce them so low that the patient will die for lack of them. We had a patient about two years ago who had a large spleen and about 200,000 w.b.c., and we gave her, I think, three treatments of radium about three weeks apart. The spleen, which was very large, disappeared on palpation or percussion. The white count went down to about 8,000. She got entirely well and went back to her occupation and remained entirely well for one year. Then the spleen became perceptible again on percussion; then became palpable, and the white count went up, but not so much—I think to about 100,000. After thinking the case over carefully we applied radium again and then the spleen rapidly became small again; the white count went down to about 4,000, and she began to bleed. She bled from the nose, vagina, rectum and under the skin. We transfused her, gave her whole blood under the skin, but she went down right along and died in a short time. Her spleen did not again enlarge so that, apparently, the radium resulted very much as if a splenectomy had been done. Apparently the radium had destroyed practically all of the spleen tissue.

It will be of interest to know what will happen to Dr. Collins' patient in the next year, and I hope that he will report to us later as to the result.

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### Meeting of Sept. 19, 1923

The annual meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, Sept. 19, 1923, with the President, Dr. H. L.

Taylor, in the chair. There were thirty-three members and three visitors present.

After the reading of the Secretary's and Treasurer's reports the following officers were elected for the ensuing year:

President—Dr. Arthur S. Hamilton, Minneapolis.

Vice President—Dr. H. P. Ritchie, Saint Paul.

Secretary-Treasurer—Dr. John E. Hynes, Minneapolis.

Dr. H. L. Taylor, the retiring President, then read his address entitled, "Tuberculosis in Man" (page 616).

Upon motion the meeting adjourned.

JOHN E. HYNES,
Secretary.

# TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

Stated Meeting Held October 4, 1923, the President, J. M. Hayes, in the Chair

## INTESTINAL OBSTRUCTION

DR. ZIEROLD: I am presenting this paper not because intestinal obstruction in itself is unusual, but rather because of the unique circumstances surrounding it and because of an unusal termination.

This patient is twenty-two years old, and has the following history: In 1921 she had an appendectomy at this hospital with an uneventful convalescence. On January 1, 1922, she was admitted here with some indefinite complaints and wished an operation for the freeing of adhesions. An operation was not advised at that time, and she was discharged. In February, 1922, she was operated on elsewhere for adhesions; and in March, 1922, she was operated at the same hospital for intestinal obstruction. At this time a resection was done. In May, 1922, she was again operated for intestinal obstruction at the same hospital and again in October of the same year. In February, 1923, the patient was admitted to this hospital with a partial obstruction or at least with symptoms that led to that belief. At this time she was observed but not operated, and was discharged soon afterward. On March 8, 1923, she was readmitted to this hospital and operated on for intestinal obstruction. Subsequently she passed a rather uneventful period until she was admitted here on September 26, with all the evidence of an obstruction. She had a history of constipation over a period of three days, passage of no gas or fecal material by rectum, nausea and vomiting, no food intake for a day and a half, and no result with repeated enemas.

On physical examination the patient was in fair condition, pulse not apparently accelerated and the volume good. The abdomen was somewhat distended and somewhat tender. That same evening surgery was advised on the basis of an intestinal obstruction. This presented some technical difficulties because at this time after a series of operations there was hardly a place left where I could get in without going through some old scarred operative field. From the sequence of events and from her appearance my impression was that the obstruction was somewhere in the lower bowel and I made the incision not by choice but by necessity; the only open space being in the right rectus.

On gaining entrance to the peritoneal cavity the viscera presented as a mass adherent one to the other and indistinguishable. By sharp dissection a distended cecum was with difficulty identified at the ileocecal valve and also what appeared to be a point of anastomosis between the large and small bowel. I attempted to explore the other side of the abdomen and identify the structures there and I was able to identify what I believed to be a collapsed pelvic colon. This I concluded to be the region of the obstruction but could not free the adhesions sufficiently well to satisfy myself that it had been relieved. The patient had about all the operating that she would stand at that time so I brought the cecum up, did a cecostomy with a Paul tube, to give her immediate relief. Since this time she has progressed nicely.

There is still some question in my mind as to whether the obstruction was completely removed. The immediate emergency of course has been passed, but what final operative procedure will be necessary I am not at present in a position to state. We will attempt a closure of the cecostomy as she says she has been getting some gas through by rectum.

There is yet another finding in this case which of course should have been emphasized at the outset but which I have reserved until the patient was removed. On opening the abdomen there were multiple nodules of various sizes scattered over the peritoneal surface and over the intestinal coils. They were hard, irregular and rather of a yellowish-gray texture and a few infiltrated the scarred abdominal fascia. In the face of these findings we had the impression that the primary cause of obstruction arose in the pelvis. Specimens were taken, and sections of these nodules showed as we expected and as we concluded at the time, adeno-carcinoma.

DR. ABBOTT: There is no record of the condition each time and what was done each time? How many operations in all?

DR. ZIEROLD: She had had four previous operations.

DR. SWEETZER: There was no fluid in the abdomen?

DR. ZIEROLD: There was a small amount of encysted fluid in the right iliac fossa.

DR. ABBOTT: Did the pictures show anything?

DR. ZIEROLD: We took no *x*-rays at this time, Dr. Abbott, inasmuch as she was admitted in the evening, and the amount of time that would elapse in getting our patient to the *x*-ray we thought would jeopardize her unnecessarily —although probably there was no reason why it could not have been done. I am sorry we cannot offer the previous operative records. Dr. Watson has been trying to complete the record but as yet we have no complete detailed report.

DR. MANN: I have seen a number of cases of these carcinomata of the ovary. We very often find them scattered through the peritoneum, but sometimes they are in large localized masses, and a great many of them do clear up when the original tumor is removed. I had one that was especially interesting to me. She was in this hospital, too, when I first saw her. She had a history of having had some sort of tumor removed by Dr. Rothrock, of St. Paul, and her left ovary was gone. I could just feel something which I thought was the stump of the pedicle and I watched that for a long time. That never changed its

size, but when I first saw her she had abdominal ascites—that's what she came in for five years ago. I could feel a moderate mass in the upper left abdomen and she had some trouble with the bowels. Then she came back to me about a year later. So then I opened her up, and this mass was a secondary mass in the omentum. I felt that little stub; that had not grown; but she had a row of five enlargements along the mesentery and right in the mid-line of the root of the mesentery of the small bowel. She didn't want any operations, but I had finally persuaded her to have an umbilical hernia repaired under local, and let me feel through the opening. The root of the mesentery of the small bowel was involved, almost the entire length to the transverse colon; so that to remove that would have interfered so much with the small bowel that I felt it would be unsafe. There were rounded elevations about the size of very large marbles—a row of five of them. One of them was sticking out, actively growing, of cauliflower type about 2x4.5 cm. I took that off the best I could. Then these others were cysts just like ovarian cysts. I opened all of those and then pulled their linings out as well as I could. That's all I did, and she is still living and fairly well. All this is about four or five years since my operation. Dr. Rothrock had operated on her one or two years before I saw her first. So that the malignancy of these papillary cysts is not as great as you might think. There are any number of these cases of so-called malignant papillary-cyst-adenomas in which the original tumor has been removed and nothing else has been done, and patients very commonly have gotten well. So that if this is a tumor of the ovary and the ovary has not been removed you may get a chance to take out that original one and let these others go down themselves.

### CASE OF UNI-LATERAL EXOPHTHALMOS

DR. A. BRATRUD: Miss E. L., age 16, female, single, American, school-girl.

F. H. Father living and well. Mother dead, age 42, influenza. Four sisters, living and well.

P. H. No previous illness.

M. H. Menses, age 14, regular every 25 days; duration 4 days; pre-menstrual cramps, severity 2 to 3. L. P. 6-15-23.

Chief Complaint. Headache. Bulging right eye.

C. H. During the past two months patient has had a headache confined mostly to region of top and back of head. Occurs twice a month lasting from one-half to one day. Notices slight headache after prolonged reading or studying. During the past four months right eye has been bulging. Friends called her attention to this condition, telling her that it was becoming worse. Sisters state that she has been "cross-eyed" for several years. Father states that the condition has existed since birth, which was entirely normal. Also states that it may be slightly larger the past two months.

Appetite good. Bowels regular. Urine normal. No gastric disturbance. No dizziness, ringing or buzzing in ears, no nervousness. No palpitation of heart. Sleep good. Does not tire easily. Has had a goiter for two years. No loss of weight.

Physical Findings. Height 5 feet 4 inches. Weight 134 pounds. No asymmetry of face. Exophthalmos of right side quite marked, the right eye protruding 4 mm. closer to lens of glasses than the right eye. No pulsation. Eyes not tender to pressure. Von Graefe negative. Dalrymple sign negative. Moebius sign negative. Nose normal, except slight deviation of bridge to the right. Mouth and throat normal. Neck reveals a goiter of moderate size with a rather hard mass in upper pole of right lobe. The growth is confined mostly to the upper lobe. No bruit in thyroid or temporal regions. Optic findings show optic discs to be normal. There is one degree of hyperopia present in both eyes. No pulsation present.

Basal metabolic rate, minus 1 per cent. Wassermann, negative. Blood pressure, 118/70. Pulse, 74. Blood and urine, normal.

Sept. 5, 1923. *X*-ray examination of the right orbit for protruding eye: Sella appears to be normal in size and contour. Sphenoidal sinus nearly normal, possibly narrowed in its transverse diameter. Orbit appears normal. There is a slight suggestion of an irregular growth in the posterior orbit. Definition not positive enough for definite conclusion.

Oct. 6, 1923. This examination of skull shows less definition at the posterior sella, the outlines both of the sella and posterior wall being extremely thin. The orbit shows no appreciable change.

Oct. 4, 1923. Headache improved since wearing glasses. No change in right eye. Physical findings show no changes except that goiter may be softer. No diagnosis has yet been made in this case as there is no history of injury. No pulsation in the eye or eyelids and no bruit in the temporal region.

Orbital cellulitis and orbital periostitis can be excluded by the fact that there are no local or general symptoms or signs of acute or chronic inflammation or infection. This also excludes cavernous sinus thrombosis.

There is no history of lues in the family and a negative Wassermann associated with all negative findings for lues practically excludes gumma in this region.

The principal conditions to be seriously considered here are new growths, i.e., ivory exostosis of orbital plates; growths within accessory sinuses of the nose causing distention of these; meningocele and encephalocele; new growths posterior to the eyeball; hernia in Tenons capsule and exophthalmic goiter.

*X*-ray plates are being taken at regular intervals with the view that if any bony growth is present it will soon show in a series of plates, as will also any change in the accessory sinuses of the nose. The only certain method of diagnosing encephalocele or meningocele is by exploratory puncture. They can sometimes be diminished in size by pressure and at times pulsate in association with respiratory and arterial oscillations. At present there are no signs of hyperthyroidism; although the exophthalmos is bilateral in most cases of hyperthyroidism, it may be unilateral, slightly greater in one eye than in the other, and vary in degree at different times. When unilateral it usually corresponds to the side on which the enlargement of the thyroid is present. Exophthalmos may be present for years before other symptoms of the complex are present and yet it may appear even in the course of 24 hours.

OPINION. The evidence at present in this case does not

point to this as being a thyroid condition. It appears to me that this condition has existed for years, and may be a result of traumatism during birth. New growth must be seriously considered from history, as obtained from sisters and friends. This case will be watched, and if any definite diagnosis or any change is noticed it will be again reported.

DR. ABBOTT: Does she seem abnormal?

DR. BRATRUD: No, there is nothing in the findings at all. All these findings are negative. There is only one thing. I think we can throw out everything else entirely. Dr. Donaldson thought there might be something suggested here in the orbital plate. I think it comes down simply to something around the orbital plate, or something posterior to that, something that may be pressing out.

DR. MANN: Did I understand you to say that exophthalmos may be present without a goiter?

DR. BRATRUD: Yes, Barker states that you may have an exophthalmos before you have any of the symptom complex of an exophthalmic goiter. He also states—which I didn't know before—that you may get a unilateral exophthalmos with the exophthalmos on the side in which the adenoma is present. I have never seen it myself.

DR. MANN: What does he state causes the exophthalmos?

DR. BRATRUD: Well, the action of the smooth muscle cells in the eyeball—the retraction of the eyelids and the action of the smooth muscles of the eyeball itself.

DR. MANN: This exophthalmos, did you consider to be the pressure on the sympathetic nervous system?

DR. BRATRUD: Well, as I understand it, the exophthalmos has not been correctly explained. It is just a theory.

DR. MANN: Well, have you noticed that this girl has an asymmetry of the head, that that side of her head is forward?

DR. BRATRUD: I didn't notice that.

DR. MANN: I think there is an asymmetry of the whole head. The left side of the face is back; the right side is forward; the left side of the forehead is back further than the right; and she has a peculiar cast to the eye. It didn't seem to me as though she had much exophthalmos. She may have some. The first point I noticed was that the pulse was practically normal, as it was given, and no nervous symptoms and so on. So that we would hardly expect an exophthalmos so soon from an exophthalmic goiter type. Could that be one of the early signs? You would hardly expect an exophthalmic manifestation from that. I have nothing further than the fact that she has an asymmetry of the head itself; and if the father says that that eye bulged at birth that is almost an explanation of the eye part of it, because it does not project very far now, it seemed to me as I looked at her.

DR. ZIEROLD: I am very glad Dr. Mann has mentioned the matter of asymmetry. It occurred to me, not through any particular keenness of observation, but perhaps because a case of hypertrophy or congenital asymmetry presented itself in this hospital a very short time ago. In view of the father's statement of exophthalmos being present at birth and in the absence of other symptoms and particularly with no widening of the lid slit, it seems quite reasonable to consider this purely as a developmental anomaly.

DR. WEBB: I recall a case of unilateral exophthalmos which occurred during my hospital service. Patient was an actress who had been on a drinking party the night before. She came in to the out-patient department on a Sunday afternoon complaining of a headache which she attributed to something she drank. There was a slight difference in the size and reaction of the pupils and she was persuaded to remain in the hospital for further study. She was found to have a positive Wassermann. The interesting point is that she developed a unilateral exophthalmos while in the hospital. It resisted the most active treatment of salvarsan and other antisyphilitic remedies and finally after two years of treatment a diagnosis of aneurysm of an artery within the orbital cavity was considered. The patient was very anxious to gain relief at any cost and finally a ligation of the carotid artery on that side was performed. This was followed by some relief but she was lost sight of and I do not know the ultimate outcome.

Dr. R. C. Webb read a paper on the Gibson Rubber Dam Tampon in Acute Appendicitis. (See page 632.)

DR. MACLAREN, St. Paul (speaking by invitation): I am very glad indeed of the opportunity to talk on this subject. I have been extremely interested along this line and I have been fortunate enough to see a number of these cases that Dr. Webb has treated at the University Hospital. The mortality of acute appendicitis is usually so confused with innocent cases that nobody knows just what the mortality of acute appendicitis is; but the mortality of the worst types of appendicitis is still very great. I can hardly tell from my own records what my mortality is. My records contain a history of every case I ever operated on; but I cannot tell on looking back which were the really desperate cases. They are all mixed in with a lot of innocent cases. And still my mortality when I come to look it up as I did a few years ago was amazingly high on the worst type of acute appendicitis.

Now there are so many angles to this subject and we have all talked and I have talked as though I knew what the Gibson drain was. I really didn't until I saw Dr. Webb use it. Within this last summer I lost a very dear friend whom I had operated upon for what I thought was not a very serious acute appendicitis; and that also stimulated my interest. I know that I have myself and allowed my asistants to sew up too many of these. We like to sew up everything. The first thing that we do in many cases that come to us from someone else in railroad surgery is to take out the stitches. They ought not to be sewed up; they ought to be left open. I approach this in the line of cases that have vomited themselves open and my statistics of some four thousand laparotomies show that one in three hundred either coughed or vomited their wounds open and they still do. And in other people's hands too; I see them at the University Hospital where there is no question about their being well taken care of. Now when a patient vomits or coughs his wound open what are you going to do with it? You can sew them up, and a good many of them will get well. Some of them won't.

When a woman came to me a number of years ago and told me that she had coughed her wound open, and that Dr. Andrews, of Mankato, had not sewed her up, I said, "I don't think it is possible!" Here she had a perfectly

beautiful wound, a wound as pretty as any abdominal wound that anyone ever sewed up. I wrote to Andrews. I thought the woman didn't know what she was talking about. He told me that that had been his custom for some time, just to wash off the intestine; and I have seen the intestine come out with the figure of eight silk worm gut stitches. Any form of stitching will not absolutely prevent this action. Now when you wash off the intestine, push it back and simply strap the wound, it is amazing what a good strong abdominal wound you will get where there has been no secondary stitching, where the stitches were all taken out at the time of the accident and edges brought together with adhesive plaster.

That led me to try—in bad, fat distended abdomens—leaving the wound wide open and simply strapping it. One of the worst cases that I saw, a neglected case, a woman who had a general septic peritonitis, where I simply opened the abdomen and fished out the appendix and didn't put the Gibson drain in as I would today; and strapped her, put a drain or two in—the wound healed and afterwards went through the Mayo Clinic and was not recognized as a hernia. She had a small hernia but it was unimportant. Here she was, a woman that weighed three hundred pounds, with a tremendously big, distended abdomen, and she never had any stitching at all.

Now Dr. Webb brings out a point which I think is very, very important. You stitch these wounds up and you get sloughing of the fascia; and when you get sloughing of fascia you are sure to get a post-operative hernia. Post-operative hernias are occurring all the time in the hands of the best operators just because of the sloughing which occurs underneath—and without it, apparently, sometimes.

I am glad to have heard this paper again, because you read these things and they don't really get home to you. They don't to me. They have to be pounded into me. I really didn't know how until now—I put a Gibson drain in two or three days ago into a very bad large abscess, and I didn't buttonhole it. I think the woman is getting well, getting along all right. I don't know how much influence the buttonholing has. I think the drainage comes on the outside of the tampon, and the value of the tampon is to prevent the intestine from coming into the wide open wound. I am going to use it a great deal more than I ever did before, if I have a chance.

Dr. MacFarlane (speaking by invitation): I don't know as I can add anything to what Dr. Webb has said, except that I didn't have to see very many of these cases to approve of it very much. Until Dr. Webb demonstrated this method of drainage, I didn't understand it. At the University Hospital all our cases were drained through the wound itself or through a stab wound; and it wasn't at all unusual in the bad cases to see pus dissecting back and forth, four or five ways on each side, and occasionally the wounds break down entirely; and we have to take out stitches and take out necrotic fascia; and those cases go on and drain for weeks and weeks. It is a different picture in these cases. Even at the end of five days when you take out your drain, the wound is walled off and it has its complete original thickness. Since this paper was written I have seen two more cases at the University Hospital. Practically all the men are using this drain there now in the bad cases. One of those cases went home today. The drains had been in about five days. At the end of that time we took the drains out completely and strapped the wound with adhesive; and at the end of about three weeks now, that wound is healed solid.

Dr. Sweetser: Of course it is not understood that other methods of drainage might not be efficient. If that were so, there are so many cases that we all see and operate on; and we don't have hernias. Not more than one-fifth of the cases here are followed by hernias. What I am getting at is that this is not a panacea against bad results. Twelve per cent, I think, died from this. I was sorry that Dr. MacLaren didn't mention the method of treatment of appendicitis of which he was the originator—draining these things through the rectum. We have had several cases—and I am very thankful to Dr. MacLaren for calling our attention to them—cases which I am sure would have died if we had opened the abdomen. Then there is another series of cases where the pus had run up outside of the cecum, and I think had to be drained by a stab wound posteriorly. I am keenly interested in this drain. If it will prevent necrosis of the theca, then it is the best kind of drain we have. I was always under the impression that the softening of the edges of the theca was the result of the infection and not the result of tension, because sometimes we have had to leave wounds more or less open and nevertheless I have thought that I got a sloughing of the edges of the theca. If this Gibson drain will prevent that, then it is the very best method of taking care of this very bad problem.

Dr. Abbott: Probably in view of the fact that we have so many bad cases of appendicitis, it is one of the most important questions that come up, how we should drain these cases. I believe we ought to throw all prejudice aside absolutely, and look at each one with an open mind. Now we have here in this society a large number of men that are getting these cases right along all the time. Why wouldn't it be a good plan for us to take a series of cases, for instance beginning now, and keep an accurate account of just the condition that we find in the patient; the patient's general condition, the condition of the appendix, the condition of the abdomen at the time it was opened, the exact method of dealing with each case; then perhaps after six months get together again and compare notes. In doing the other way, the way that is generally done—for instance, in the Western Surgical at our last meeting a gentleman read a paper on an extensive series of bad appendices with general infection of the abdomen. These cases he had operated and closed without drainage. He was a strong advocate of not draining any cases. That brings us, you see, right to a wall. He had a series of two or three or four hundred cases and a remarkably low mortality, and he drained practically none of it. He said now that he was closing them up absolutely and not draining a thing. On the other hand, we are getting good results by draining. A great many are reporting these cases, as you have seen tonight, and this method appears favorable. Now the question is: Is either side right? Are we exactly right? I believe that that way of getting together and comparing notes will be a better way than to depend on one man's successes.

DR. MACLAREN: I would like to say a word or two more. Dr. Sweetzer has been kind enough to give me credit for being the originator of rectal drainage, but it was not original on my part. A doctor in Brooklyn has suggested it. Now I don't believe that Dr. Abbott believes—and I don't believe that any of us believes that a general septic peritonitis is going to get well if we do not open it. I do not believe that we are talking about the same kind of cases when he says that men open them and sew the wall up. I can't see how it is possible to explain the recovery of some of these bad acute septic peritonitis cases without helping nature just as much as we possibly can. We all see the worst types occasionally—they are not very frequent. An ordinary acute appendix, because it is gangrenous and because it has a little pus around it—that is not the type we are trying to get at. I think we are talking of the neglected cases; and there is where the drainage comes in, after your operation. I have done it most of the time on my own cases. When you see a patient is not going to get well, and when he is dragging along, very, very desperately sick, and you feel a bulging along the wall of the abdomen—I don't think these are the kind to which he is referring. A child will come in with a neglected general septic peritonitis which has localized down in the pelvis and you have an abscess. Then the first step is not to open the abdomen but to let out the pus through the rectum and in a day or so go ahead and do something else; because some children that I did that to died in spite of my rectal drainage, when I had not gotten the appendix.

As I say, the cases that I here meant and that brought this drainage home to me are my own cases. One of them did die and I made a post-mortem on him; and others that I felt sure were going to die, and that had a perfectly remarkable, wonderful recovery, with gradual drainage of the wound. Stanley Spillman told me that he had to supplement vaginal drainage; he had to sometimes drain the women through the rectum, besides the vaginal drainage. I can't see why you don't get to the bottom of the pit when you go up from below, but you apparently do not.

DR. ABBOTT: Just one word to put myself right with Dr. MacLaren. I want to be all right with him anyway. I am not taking either side. I am merely citing this man as being on one side. I have an open mind about it. I am willing to adopt the best thing, and I want to adopt the best thing. That is why I am interested in it. But speaking of drainage, the reasons that this gentleman gave for not draining are these: He cited a great many cases of general peritonitis accompanying acute appendicitis, and then he reasoned that you can put in a drain if you like and get the drainage from that area; but you do not get the drainage from the rest of the intestinal tract. That was his argument. Now that is as much as I know about it. We have all tried it, and we have all our own impressions; but I believe it would be a good thing to get up a good system of co-operation.

DR. MACLAREN: Now, Dr. Abbott, I have drained a man six or seven times, in six or seven places, and still had him die from general septic peritonitis—rectal drainage, both loins and both kidneys—and still the abscess formation going on in some of these cases. You can't get ahead of it. The man dies and you make a post-mortem and there is still another abscess that you could not reach.

DR. BRATRUD: I think that a good deal of this question of drainage comes right back to a question of infection in the wound. Everybody will agree that those wounds do not become infected like the wounds that have been closed. We did a hysterectomy and appendectomy on the same woman, and four days later the case died. We hadn't even looked at the wound. We opened up the abdomen and the wound was infected. We examined it, and the abdominal cavity was absolutely clean. I think a good deal of these are the results of some of these infections in the abdominal wall, more from the infection of the wound than from the infection of the peritoneal cavity.

DR. WEBB: I wish to thank the members for this very interesting discussion. It is to be expected that there will be some difference of opinion inasmuch as all have had very serious cases with a satisfactory outcome. We immediately come back to the old question, how long does a drain drain when inserted in the peritoneal cavity? In a very few hours it is surrounded by fibrinous adhesions and it drains only the surface in immediate contact with its surface. With the tampon properly inserted the maximum portion of the abscess cavity and the infected area in the peritoneal cavity is in contact with the drain and as a result there is maximum output of toxic material. There is a tremendous purulent discharge in all of these patients during the first eight days. If this material is allowed to escape through the wound rather than through the ordinary excretory channels it is reasonable to expect a more rapid clearing of the evidence of general sepsis and such is the case clinically. It is difficult to compare results in patients of this type but I hope that some of you will try the Gibson tampon in your next serious case and carefully observe the progress. Of course some of them will not recover. I recall one of the twenty cases included in the deaths reported by C. E. Farr, of New York. The patient was moribund when operated upon and died three hours after operation. We were fortunate that she did not die on the table, but we could not refuse to operate.

As to the question of closure of such cases without drainage. It is well known that cases of perforated gastric ulcer can be thoroughly aspirated, the perforation closed and the abdomen closed without drainage. On the other hand some cases of appendicitis have sufficient resisting power to form abscesses and finally result in absorption of the abscess. We also know, and we learned rapidly during the war, that in infected wounds in other parts of the body it was essential to have wide open drainage and that it was well to open the wound about one-third more than seemed necessary at the time of operating in order that one might provide against the swelling which takes place about an infected wound and which interferes with drainage. The Gibson tampon approaches wide open drainage as nearly as is possible in the abdominal cavity.

As to infection of the wound. It is very rare that there is any evidence of wound infection due to the perfect drainage afforded by the numerous folds in the rubber dam tampon. If one is careful not to clean the fascia and thus deprive it of its blood supply there will be little opportunity left for possible pockets for the pus. With the ordinary

method of suturing the layers of the abdominal wall it is impossible to prevent a possible pocketing along both the upper and lower surfaces of each layer sutured. When such a case does become infected and the fascia sloughs we endeavor to hasten healing by cutting away the necrotic fascia. It usually results in a sloughing of an oval area of fascia leaving a gap which is bridged by scar tissue. If a hernia occurs the ease of repair is directly dependent on the amount of destruction of fascia.

DR. SWEETSER: Do I understand you then, Dr. Webb, to say that there is no necrosis of the theca in these cases that are left wide open?

DR. WEBB: There was no necrosis in the four cases which I reported. However, in the one hundred and sixty-two cases reported from Dr. Gibson's service there was very slight necrosis in a very few of the cases.

# PROGRESS

**Abstracts to be submitted to Section Supervisors.**

## MEDICINE

SUPERVISORS:
F. J. HIRSCHBOECK,
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THE PRESENCE OF BACTERIA IN THE LUNGS OF MICE AFTER INHALATION: Ernest G. Stillman (Jour. of Exp. Med., Aug. 1, 1923). The author caused mice to inhale an atmosphere in which a fine mist had been produced by spraying a culture of various organisms (pneumococcus, streptococcus hemolyticus, bacillus influenzæ, staphyloccus); 10-15 c.c. of broth cultures were used and the spray continued for 10 to 15 minutes. The mice were removed and killed at varying intervals. Precautions were taken to prevent aspiration at the time of death and other sterile precautions used. Cultures were made from the heart's blood, the spleen and the lungs. It was found that under such circumstances the bacteria readily penetrated into the lower respiratory tract. Pneumococci were found to usually disappear within a few hours and give rise to no infection. Hemolytic streptoccocci persisted for a considerable length of time and a general septicemia usually followed. Attempts were made to bring about a local or general infection with pneumococci by chilling the animals before, during and after the experiment; also inhalation of ether, finely divided quartz sand or talc did not make the animals any more susceptible than before.

T. A. PEPPARD.

THE VESSELS CONCERNED IN CLINICAL "CAPILLARY PULSATION": J. J. Sumbal (Vol. 10, July, 1923). The author describes his method of observing the movements in and of the capillaries. He is enabled to obviate the difficulties of other workers who have been confused by movements of the nail bed as a whole. He concludes that clinical capillary pulsation of the lip as this is seen in cases of free aortic regurgitation is a phenomenon of the capillaries themselves.

T. A. PEPPARD.

THE DIFFERENTIAL DIAGNOSIS OF DIABETES: Henry J. John (Amer. Jour. Med. Sc., Aug., 1923). The author calls attention to the ambiguous position in which the clinician is often placed when a patient presents himself with no subjective complaints but is referred by the family doctor or the examiner of a life insurance company because sugar has been found in the urine either once or repeatedly. The physical examination is entirely negative, an examination of the urine frequently discloses no sugar, and an examination of the fasting blood sugar shows a normal content.

The writer warns against too definite advice without more careful observation, either in condemning the patient as a diabetic or allowing him to disregard the finding altogether.

The presence of sugar in the urine tells only that the kidney is permeable to sugar, but by itself doesn't disclose at what blood sugar concentration the overflow takes place, and since the permeability of the kidneys to glucose varies with the individual, he suggests reliance on the glucose tolerance test as of distinct confirmatory value in the early diagnosis.

He reports three instances in which the glucose tolerance test was of distinct value in the establishment of the presence of diabetes or not, and warns clinicians not to base the diagnosis on urinary examinations alone, on account of the danger to the patient if diabetes is present, and on account of the disadvantage of a deficient diet if the patient is not diabetic.

F. J. HIRSCHBOECK.

## SURGERY

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SURGERY OF THE THYROID AND ITS MORTALITY: Charles H. Mayo and John deJ. Pemberton (Ann. of Surgery, Vol. 78, No. 2, August, 1923). Accurate classification of thyroid conditions is necessary in computing the mortality of thyroid operations. The presence or absence of hyperthyroidism and the nature of the hyperthyroidism are very important.

Operative and postoperative accidents are the only dangers involved in operations on simple goiters, which include adenomatous goiters, malignant goiters, thyroiditis, pulmonary infections, obstructive dyspnea, tetany, and intercurrent diseases. In 16 months 819 thyroidectomies were performed on 819 patients with simple goiter with three deaths, making a mortality of 0.36 per cent.

Exophthalmic goiter and adenomatous goiter are considered separately because of the difference in efficiency of preoperative preparation and other features. Patients with exophthalmic goiter are coming for surgery earlier than previously and this fact has improved the operative mortality and end results. Another very important factor in reduction of postoperative reaction of hyperthyroidism is medi-

cal and surgical preparation. The medical measures consist of rest, adequate food and fluid intake, digitalis as indicated, and the one administration of Lugol's solution under the control of basal metabolic estimations. Injections of hot water or a ligation is done in doubtful cases as a surgical tolerance test. Thirty per cent of the patients need no special preparation and 20 per cent are so bad that they are sent home for a period of three months to rest after two ligations. This régime has lowered the mortality to 1.5 per cent by case and to 0.92 per cent by operation. Primary thyroidectomy has increased 18 per cent and the necessity for two or more ligations has decreased 12 per cent under the combined medical and surgical management.

The dangers of surgery in adenomatous goiter with hyperthyroidism are mostly the dangers of the results of visceral degenerative changes and not the dangers of acute hyperthyroidism as in exophthalmic goiter. The intensity of hyperthyroidism is usually slight acting over a long period of time, so that the course of this disease is insidious. In bad cases preparatory measures are not effectual so that the operative risk is relatively light. The operative mortality is 3.24 per cent in this type of case and dependent upon the number of bad risks accepted.

"Because of the facts that the successful removal of adenomatous tissue is followed in from ten to fourteen days by a complete subsidence of hyperthyroidism, and that the improvement is immediate in many of the otherwise hopeless cases, extension of the limits of operability to include nearly all patients is justified."

A table of operative mortality of exophthalmic goiter operations from January 1, 1922, to May 1, 1923, closes the paper.

V. C. Hunt.

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THE OPERATION OF CHOICE IN SURGERY OF THE KIDNEY: William E. Lower (Ann. of Surg., August, 1923). In contemplating surgical operations upon the kidneys, the following must be considered:

1. Presence or absence of a second kidney.
2. The function of both kidneys.
3. Which kidney should be operated on first, where both are in need of surgery.

Tumors of the kidney are practically always malignant and should be treated by nephrectomy, with removal of as much fatty capsule as possible, followed by deep *x*-ray therapy.

Stone in the pelvis of the kidney should be removed surgically by opening through the pelvis. Many stones in the substance of the kidney near the pelvis are best removed through a pelvic incision or an incision in the pelvis extending up through part of the kidney substance. Bisection of the kidney is never indicated. One can be certain that all the stones are out by fluoroscopy or by taking a plate. When stones are present in both kidneys the location of the stones may be the determining factor as to which should be operated on first. A stone which is blocking the urine is more destructive to function than one elsewhere. Cases of bilateral stones should practically always be operated on because they will eventually destroy life.

Tuberculosis on one side with definite abscesses calls for nephrectomy. However, in cases where there are only subcapsular tubercles, it is better to leave the kidney alone, as nephrectomy often lights up a general miliary dissemination. The problem in these cases is diagnosis. In cases of bilateral tuberculosis, symptoms may be alleviated by removing the more extensively involved kidney.

When there is a well defined local abscess in cases of kidney infection other than tuberculosis, a nephrectomy should be done. Cases with multiple septic infarcts involving the kidneys should not be operated upon early, as many of them in which both kidneys are involved will recover.

Hydronephrosis (especially infected hydronephrosis) is best treated by nephrectomy. "No inclusive statement can be made regarding the operative management of any type of kidney lesion. All factors in the individual case must be considered in making a decision as to the proper operative procedure. If the proper preoperative precautions are taken and a careful choice of operation is made, the mortality rate of operation on the kidney will not be high. In my own series the mortality rate has been 1.7 per cent."

W. P. Herbst.

## PEDIATRICS

SUPERVISORS:
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THE TREATMENT OF VASCULAR NEVI WITH RADIUM: R. H. Rulison and Stafford McLean (Am. Jour. of Dis. of Child., May, 1923). The type of lesion treated by radium in this study may be classed as raised capillary hemangiomas. A fairly uniform experience warrants the generalization that, other things being equal, the younger the patient, the better and more rapid are the results under radium therapy. Angiomas are much more refractory in adults than in children. In the former, they are really organized tumors. The presence of ulceration and hemorrhage is not a contraindication to the use of radium. In the therapy of vascular nevi, a fairly wide range of selection is open to the physician: surgery, the electrolytic needle, electrocoagulation, carbon dioxid snow, caustics, ultraviolet light, roentgen rays and radium. These have all been used with varying degrees of success, depending on the location, type and size of the nevus and upon the skill of the operator. The electrolytic needle is the method of choice in the treatment of the spider nevi and telangiectasia in general. When used on the larger growths, much depends on the skill of the operator. There is usually some scarring. Electrocoagulation is one of the newer methods of treatment and has much to commend it. Few men have had enough experience with it to use it successfully. In any case it involves the ability to determine in advance the limits of the growth, and this in certain cases offers a difficult problem. If it were possible to locate the main vessels supplying the nevus and obliterate them by this meth-

od, it is conceivable that a perfect result might be obtained. For the cavernous types of angioma of moderate size with a hard background, such as the bones of the skull or any other bony background or even firm muscle that exerts counter pressure, carbon dioxid snow is probably the method of choice. The use of carbon dioxid snow presupposes the necessity of destroying the covering of the blood vessels and replacing it with scar tissue. The use of caustics, either acid or alkaline, is becoming less common. The method has no advantages over other forms of therapy, and sometimes unsightly scars result. Treatment of port wine marks by the use of the Kromayer lamp has given good results in the hands of a few, expert in its use; most patients become discouraged because of the large number of exposures required and the slow improvement observed. The treatment of vascular nevi by means of the roentgen ray is no longer in vogue, for their response to radium is much more prompt and complete. The advantages of radium treatment are the freedom from pain, the very gradual changes in the lesion which can be watched from treatment to treatment and the probability of causing the lesion to disappear without appreciable damage to the overlying skin. The scar following the skillful use of carbon dioxid snow is often insignificant. Telangiectasia, classed as nevi, is better treated by electrolysis. Surgery often gives brilliant and rapid results. In certain selected, raised vascular nevi of the face, radium therapy yields results which probably cannot be achieved by other methods, especially if the treatment is commenced in early infancy.

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ULCERATIVE STOMATITIS AND ITS TREATMENT BY THE INTRAVENOUS INJECTION OF ARSENIC: Edward A. Morgan (Amer. Jour. of Dis. of Child., May, 1923). The terms Vincent's angina, trench mouth and suppurative gingivitis refer to an acute infection of the gums by spirilla and fusiform bacilli, producing certain local signs, such as spongy, bleeding gums, necrotic areas in the immediate vicinity of the teeth and general symptoms, as malaise, pyrexia and anorexia. The predisposing causes of suppurative gingivitis are lowered vitality and oral uncleanliness. The exciting cause is an infection of the gums by Vincent's organisms. Smears from the buccal mucous membrane of fifty normal mouths gave only one positive result for Vincent's organisms. Smears from the teeth of twenty-five normal persons gave four positive results, whereas smears from diseased teeth of a large number of persons gave 90 per cent positive results. Although the infection is, in many cases, autogenic, it is very readily transmitted from one person to another. The two principal modes of transmission are kissing and the use of food utensils which have been carelessly washed. The onset of the condition is usually sudden. Anorexia is an early and constant symptom, the child refusing all solid food; even liquids are taken sparingly. The breath is very offensive, the odor being identical with that given off from any putrefactive process. The gums are deep red or purplish and heaped up around the teeth; they bleed very readily at the slightest touch, and, if the disease has been of four or five days' standing, there are often areas of necrosis along the gum margin. The employment of some form of arsenic in solution has been advocated, the most popular formula being known as Bowman's solution, which consists of a solution of potassium arsenite, 12 c.c.; wine of ipecac, 12 c.c., and glycerin, 8 c.c. This was painted on the inflamed gums several times daily, but although the relief was immediate it was not always permanent. It seemed reasonable to assume that arsenic administered intravenously would be more apt to reach these deep foci and thus effect a more lasting cure. There were no instances of the disease occurring in children before the eruption of teeth.

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## GYNECOLOGY AND OBSTETRICS

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ISOAGGLUTINATION IN NEW-BORN INFANTS AND THEIR MOTHERS. A Possible Relationship Between Interagglutination and the Toxemias of Pregnancy: Irvine McQuarrie (Johns Hopkins Hospital Bulletin, Vol. 34, 384). The paper deals with isoagglutination in new-born infants and their mothers with special references to the etiology of eclampsia and pre-eclamptic toxemia. Observations of Flexner showed that the hyaline thrombi found in areas of necrosis in the livers of women dying of eclampsia were composed of agglutinated red blood cells. One explanation of the presence of agglutinated red-blood cells in the maternal circulation is the possibility of isoagglutination between maternal and fetal blood, provided: (1) that the fetal blood shows the phenomena of agglutination; (2) that the blood grouping of the fetus differs from that of the mother, and (3) that the placental barrier between the two circulations is broken down, allowing fetal blood to reach the maternal circulation. Concerning the clinical features of blood transfusion reactions: recognized that severe toxic reactions occur in man when unsuitable blood or hemagglutinative and hemolytic serum is transfused from one individual to another. These reactions frequently suggest the symptoms and signs observed in certain toxemias of pregnancy, namely: rigors, fever, vomiting, embolic and thrombotic phenomena, jaundice, hemoglobinuria, albuminuria, oliguria, edema, urticaria, pruritis, headache, dizziness, blurring of vision, epigastric pain, constriction, increase in blood-pressure, convulsions, anaphylactic shock, coma and death. There is some evidence that the proteins of one human blood group when introduced parenterally into individuals of another group act precisely as foreign proteins and give a reaction similar to serum sickness. Studies of the thrombotic and embolic phenomena of transfusion reactions, though fragmentary, demonstrate that agglutinated red-blood cells from various sources may form hyaline thrombi in the capillaries of the liver, kidney and other organs, leading to focal necrosis. Pearce showed hemagglutinative serum, given intravenously, causes such

changes within 24 to 48 hours. Such lesions resemble those originally described by Flexner in eclampsia.

The present research involved the matching of the blood of a series of 180 new-born babies with that of their mothers, to determine the presence of agglutinins and grouping. Both normal and toxemic cases were included. The clinical observations were made by other members of the staff and later the findings were compared. In the 180 cases, 84 showed no evidence of isoagglutination, 53 showed a partially established blood-grouping the same as that of the mother, 44 had a grouping established different from that of the mother. Receptors are present at birth more frequently than are agglutinins, since in but five instances did the child's serum agglutinate the mother's corpuscles, while the child's red-blood cells were agglutinated by the mother's serum in 42 cases. This shows that agglutinins are not easily transmitted through the placenta.

The distribution of the cases of mild and outspoken toxemia is shown graphically in two charts. Interagglutination of maternal and fetal blood occurred in 44 cases or 24 per cent of the total. Of these 16 were normal, 18 mildly toxic and 10 definitely so. In 124 cases or 75.6 per cent of the total there was isoagglutination between the fetal and maternal blood and there were but six cases of mild toxemia and six of outspoken toxemia in this group. In other words 70 per cent of the toxemias occurred in the 44 cases of isoagglutination or 24.4 per cent of the entire series.

In 44 cases the maternal and fetal blood was found to be incompatible, which group included 18 instances of mild toxemia and 10 of outspoken toxemia, while among 52 cases where the bloods were not incompatible there occurred but one definite toxemia and one mild form. Ninety-three per cent of the toxemias occurred among the group with incompatibility of the maternal and fetal blood as compared with 6.3 per cent in the cases where no such incompatibility existed. According to the limited data presented toxemia would be 16.5 times more likely to occur when the maternal and fetal bloods are incompatible than when they are in the same group. When the clinical features of blood transfusion reactions are compared with those of obstetrical toxemias, a certain similarity must be admitted. Before considering such a casual relationship, the following requirements must be fulfilled: (1) the isoagglutination characteristics must be developed when the toxemia appears; (2) that the fetal blood grouping differ from the maternal; (3) that a sufficient fetal blood enter the maternal circulation to give rise to the pathological changes observed. The author develops sufficient evidence from the literature and his own experience to suggest that the requirements may be fulfilled.

His conclusions are: (1) the isoagglutination blood group is completely established at the time of birth in a small per cent of cases and partly established in a relatively large number; (2) the intact placenta is impermeable to isoagglutinins and the blood group of the infant may differ from that of its mother; (3) before the mother's blood or that of any other individual is employed for transfusion of an infant, it should in every case be matched with that of the infant; (4) although the data submitted do not permit final conclusions, they suggest a relationship between the incompatibility of maternal and fetal blood on the one hand and the development of eclampsia or pre-eclamptic toxemia; (5) such a theory is merely tentative and cannot be accepted till a satisfactory mechanism has been demonstrated by which the fetal blood can gain access to the maternal circulation.

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THE OLSHAUSEN OPERATION FOR SUSPENSION OF THE UTERUS: William P. Graves (Amer. Jour. Ob. and Gyn., Vol. 6, No. 2). The author discusses briefly the cardinal symptoms of the condition. He places special emphasis on the descensus of the uterus at the pivotal point of the internal os, and in his operation aims primarily to restore this to its normal level. He discusses critically the various types of operation in common use. In Graves' clinic the Olshausen operation has come to be used as the method of choice. They follow a simple technique similar to that commonly described. The round ligaments are clamped firmly one-half inch from the uterus, which is then drawn up to the abdominal wall. Braided silk is used and is passed through the peritoneum, muscle and fascia close to the midline, and is tied within the peritoneum.

In some of the most marked cases hysterectomy is done, the round ligaments sutured in the stump and the entire mass supported by fastening the ligaments to the anterior wall as above described. They have had no cases of intestinal obstruction. In instances of marked relaxation of the abdominal wall it may be necessary to repair the diastasis of the recti muscles. The author's experience with this operation includes 1,370 cases, of which 746 were available for follow-up study. In six cases the artificial ligament failed to hold. In 15 of the 1,370 cases the silk stitch became infected and in six required removal. There were no known cases of intestinal obstruction or of dystocia. Graves regards the operation as the simplest and most easily performed, and as the equal to any and superior to many of those in common use. It is simple and avoids extensive dissection. In cases of prolapse it permanently reduces the descensus and relieves symptoms. It is the chief factor in the cure of cystocele. Its one serious drawback is the silk ligature, which, however, is essential.

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## ROENTGENOLOGY

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A NEW METHOD FOR THE ROENTGEN EXAMINATION OF THE COLON: A COMBINATION OF THE CONTRAST ENEMA AND AIR INFLATION: A. W. Fischer (Klinische Wochenschrift, August 20, 1923). At present the contrast meal, the contrast enema, and air inflation are the approved methods in the roentgen examination of the colon. The first is objectionable because of failure to fill out the bowel; the second, because of the

superimposition of loops of colon in the region of the sigmoid and the frequent failure to properly visualize the cecum and ascending colon; the third because of haziness of contour and irregular filling.

The author combines the contrast enema and air inflation by using a double stop-cock, first injecting a barium mixture until it reaches the cecum, and then inflating with air. The latter is done with the patient in the erect or the prone lateral position, under the guidance of the fluoroscope.

The advantages of this method are due to the greater separation of the walls of the bowel, the floating up of the colon, and the clearer definition which is the result of the contrast between the air and the barium. As a result of the inflation a thin layer of the mixture clings to the wall of the bowel while ulcerations cause small collections of the mixture in one area. Tumors appear very sharply and adhesions can easily be recognized. The spleen, liver, and often the gall-bladder are clearly visualized, and adhesions to the liver are shown. In two hundred cases already done by this method no harmful results whatever have been noted. Six case reports are presented with plates to illustrate the application of the method. These include a wide variety of pathological conditions and serve to indicate the advantages of the method; by means of it mistakes in diagnosis which were the result of the use of the contrast enema were corrected. The author feels that a marked improvement will take place in the examination of the colon if this method is used, especially in the diagnosis of early carcinoma.

LEO G. RIGLER.

# BOOK REVIEWS

## BOOKS RECEIVED FOR REVIEW

THE NOTE BOOK OF AN ELECTRO-THERAPIST. Mel. R. Waggoner, M.D. 173 pages. 25 illustrations. Chicago: McIntosh Electrical Corporation, 1923. Cloth, $5.00.

RUBBER AND GUTTA PERCHA INJECTIONS. Charles Conrad Miller, M.D. 99 pages. Illustrated. Chicago: Oak Printing and Publishing Company, 1923. Cloth, $1.75.

IMPOTENCY, STERILITY AND ARTIFICIAL IMPREGNATION. Frank P. Davis, M.D. C. V. Mosby Co.

This book may have been written for the entertainment and enlightenment of the layman rather than for information for the student of medicine.

The author devotes a chapter to each of the senses of smell, hearing and sight in their relation to the sexual desire but not a paragraph is devoted to the rôle that might be played by members of the endocrine family in the rather baffling question of sterility.

The new procedure of tube inflation is not mentioned, nor does the author quote statistics.

Two chapters are devoted to therapeutics in which are mentioned Gold, Wintergreen, Quinine, Witch Hazel, Strychnine, Bromides, Sulphur, Phosphorus and Zinc, etc., etc., even Chinese incense.

A. G. SCHULZE, M.D.

CLINICAL LABORATORY METHODS. R. L. Haden, M.D. Pp. 294. St. Louis, C. V. Mosby Co., 1923.

This is a very much condensed work and should be an excellent reference book for all laboratory workers. It cannot be too highly recommended for use in Hospital Laboratories where technicians are being trained. It covers practically the whole field of Clinical Pathology. This is done by giving just one reliable and accepted test for each routine laboratory procedure. As a whole these tests are well selected. But in this connection must be mentioned the unfortunate absence of any consideration of such an important test as that of Basal Metabolism.

In such a condensed work it would be impossible to give interpretations of results and this has not been attempted. However, in many cases, normal findings have been given for quantitative tests. In this connection, a goodly number of well devised charts are given.

The chapters on blood are especially good, containing, as they do, the results of the author's recent original work on Volume Index and Hemoglobin Saturation Index.

A. C. POTTER, M.D.